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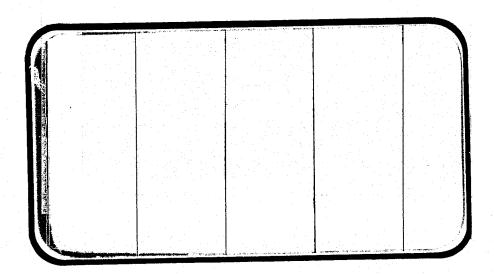
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA CR-141521

(NASA-CR-141521) RESULTS OF INVESTIGATIONS ON THE 0.004-SCALE MODEL 74-0 OF THE CONFIGURATION 4 (MODIFIED) SPACE SHUTTLE VEHICLE ORBITER IN THE NASA/MSFC 14-BY-14-INCH TRISONIC WIND TUNNEL (OA131) G3/18

N75-25999

Unclas 18 27790



SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT



JOHNSON SPACE CENTER HOUSTON, TEXAS



DMS-DR-2232 NASA-CR-141,521

RESULTS OF INVESTIGATIONS ON THE 0.004-SCALE MODEL
74-0 OF THE CONFIGURATION 4

(MODIFIED) SPACE SHUTTLE VEHICLE ORBITER IN THE
NASA/MSFC 14-BY-14-INCH TRISONIC WIND TUNNEL (0A131)

Ву

M. E. Nichols Shuttle Aero Sciences Rockwell International Space Division

Prepared under NASA Contract Number NAS9-13247

Ву

Data Management Services Chrysler Corporation Space Division New Orleans, La. 70189

for

Engineering Analysis Division

Johnson Space Center National Aeronautics and Space Administration Houston, Texas

WIND TUNNEL TEST SPECIFICS:

Test Number: MSFC 14-607

NASA Series Number: 0A131 Model Number: 74-0

Test Dates: 12 through 26 September 1974

Occupancy Hours: 88

FACILITY COORDINATOR:

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Chrysler Corporation Space Division assumes no responsibility for the data presented other than display characteristics.

RESULTS OF INVESTIGATIONS ON THE 0.004-SCALE MODEL
74-0 OF THE CONFIGURATION 4

(MODIFIED) SPACE SHUTTLE VEHICLE ORBITER IN THE
NASA/MSFC 14-BY-14-INCH TRISONIC WIND TUNNEL (0A131)

Ву

M. E. Nichols, Rockwell International Space Division

ABSTRACT

This report presents the results of an oil flow boundary-layer visualization wind tunnel test of an 0.004-scale model (Model number 74-0) of the Configuration 4 (Modified) Space Shuttle Vehicle Orbiter in the NASA/ Marshall Space Flight Center 14-by-14-inch Trisonic Wind Tunnel. The model was tested at Mach numbers from 0.60 through 2.75, at angles-of-attack from 0 through 25 degrees, and at unit Reynolds numbers from 5.0 to 7.0 million per foot.

The test program involved still and motion picture photography of oil-paint flow patterns on the orbiter, during and immediately after tunnel flow, to determine areas of boundary-layer separation and regions of potential auxiliary power unit exhaust recirculation during transonic and low supersonic re-entry flight.

The test was conducted as NASA Series Number OA131; the MSFC identification was TWT-607. One hundred and nine (109) runs were accomplished in 88 test hours from 12 through 26 September 1974. All objectives were attained, along with some additional low angle-of-attack runs.

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1.	Axis systems.	25
2.	Vehicle 4 (modified) Orbiter as simulated by model 74-0 for test series OA131.	26

Figure	δe _L	δe _R	δ_{R}	^δ SB	δ_{BF}	Dataset Identifier	Run No.	Mach No.	Angle of Attack	Page
3	-0.9	-0.7	0	0	0.1	2	75	0.6	5°	27
4	-0.9	-0.7	0	0	0.1	3	74/1	0.6	10°	30
5	-0.9	-0.7	0	0	0.1	4	73	0.6	15°	33
6	-0.9	-0.7	0	0	0.1	5	72	0.6	20°	36
7	-0.9	-0.7	0	0	0.1	6	71	0.6	25°	39
8	-0.9	-0.7	0	Ō	0.1	1	93	0.9	0°	42
9	-0.9	-0.7	0	0	0.1	2	76	0.9	5°	45
10	-0.9	-0.7	0	0	0.1	3	77	0.9	10°	48
11	-0.9	-0.7	0	0	0.1	4	78	0.9	15°	51
12	-0.9	-0.7	0	0	0.1	5	79	0.9	20°	54
13	-0.9	-0.7	0	0	0.1	6	80	0.9	25°	57
14	-0.9	-0.7	0	0	0.1	1	92	1.10	0°	60
³ 15	-0.9	-0.7	0	0	0.1	2	85	1.10	5°	63
16	-0.9	-0.7	0	0	0.1	3	84	1.10	10°	66
17	-0.9	-0.7	Ō	Ō	0.1	4	83	1.10	15°	69
18	-0.9	-0.7	Ō	Ō	0.1	5	82	1.10	20°	72
19	-0.9	-0.7	Ö	0	0.1	6	81	1.10	25°	75
20	-0.9	-0.7	0	0	0.1	1	91	1.25	0°	78
21	-0.9	-0.7	Ō	0	0.1	2	86	1.25	5°	81
22	-0.9	-0.7	0	0	0.1	3	87	1.25	10°	84
23	-0.9	-0.7	0	0	0.1	4	88	1.25	15°	87
24	-0.9	-0.7	0	0	0.1	5	89	1.25	20°	90
	-0.9	-0.7	Ŏ	ŏ	ŏ. i	ő	90/1*	1.25	25°	93
26	-0.9	-0.7	Ŏ	Ŏ	0.1	18	90*	1.25	25°	96
27	-0.9	-0.7	Ö	Ŏ	0.1	i	94	1.46	0°	99
28	-0.9	-0.7	Ö	Ŏ	0.1	2	95	1.46	5°	102
29	-0.9	-0.7	Ö	Ŏ	0.1	3	96/1	1.46	10°	1.05
30	-0.9	-0.7	Ŏ	Ö	0.1	4	97	1.46	15°	108
31	-0.9	-0.7	0	Ö	0.1	5	98	1.46	20°	111

^{*} Run 90/1 was repeat of run 90 with improved oil consistency

NOTE: Each figure has three parts: a. Right side view b. Left side view c. Top view

INDEX OF DATA FIGURES (Continued)

Figure	δ ε _	δe _R	^δ R	δSB	^δ BF	Dataset Identifier	Run No.	Mach No.	Angle of Attack	Page
32	-0.9	-0.7	0	0	0.1	6	99	1.46	25°	114
33	-0.9	-0.7	0	0	0.1	2	104	1.96	5°	117
34	-0.9	-0.7	0	0	0.1	3	103	1.96	10°	120
35	-0.9	-0.7	0	0	0.1	4	102	1.96	15°	123
36	-0.9	-0.7	0	0	0.1	5	101/2	1.96	20°	126
37	-0.9	-0.7	0	0	0.1	6	100	1.96	25°	129
38	-0.9	-0.7	Ō	0	0.1	2	105/1	2.75	5°	132
39	-0.9	-0.7	0	0	0.1	3	106/1	2.75	10°	135
40	-0.9	-0.7	0	0	0.1	4	107/5	2.75	15°	138
41	-0.9	-0.7	0	0	0.1	5	108	2.75	20°	141
42	-0.9	-0.7	0	0	0.1	6	109/3	2.75	25°	144
43	-13.5	7.0	-10.0	57.8	16.2	7	66/1	0.6	5°	147
₽ (4	-13.5	7.0	-10.0	57.8	16.2	8	67/1	0.6	10°	150
45	-13.5	7.0	-10.0	57.8	16.2	9	68	0.6	15°	153
46	-13.5	7.0	-10.0	57.8	16.2	10	69	0.6	20°	156
47	-13.5	7.0	-10.0	57.8	16.2	11	70	0.6	25°	159
48	-13.5	7.0	-10.0	57.8	16.2	• 7	65	0.9	5°	162
49	-13.5	7.0	-10.0	57.8	16.2	8	64	0.9	10°	165
50	-13.5	7.0	-10.0	57.8	16.2	9	63	0.9	15°	168
51	-13.5	7.0	-10.0	57.8	16.2	10	62	0.9	20°	171
52	-13.5	7.0	-10.0	57.8	16.2	- 11	61	0.9	25°	174
53	-13.5	7.0	÷10.0	57.8	16.2	7	56	1.10	5°	177
54	-13.5	7.0	-10.0	57.8	16.2	8	57	1.10	10°	180
55	-13.5	7.0	-10.0	57.8	16.2	9	58	1.10	15°	183
56	-13.5	7.0	-10.0	57.8	16.2	10	59	1.10	20°	186
57	-13.5	7.0	-10.0	57.8	16.2	11	60/1	T.10	25°	189
58	-13.5	7.0	-70.0	57.8	16.2	7	55	1.25	5°	192
59	-13.5	7.0	-10.0	57.8	16.2	8	54	1.25	10°	195
60	-13.5	7.0	-10.0	57.8	16.2	9	53	1.25	15°	198
61	-13.5	7.0	-10.0	57.8	16.2	10	52	1.25	20°	201
62	-13.5	7.0	-10.0	57.8	16.2	11	51	1.25	25°	204 207
63	-13.5	7.0	-10.0	57.8	16.2	7	46/1	1.46	5°	207

INDEX OF DATA FIGURES (Continued)

Figure	δeL	δe _R	δ _R	δ _{SB}	^δ BF	Dataset Identifier	Run No.	Mach No.	Angle of Attack	Page
64	-13.5	7.0	-10.0	57.8	16.2	8	47	1.46	10°	210
615	-13.5	7.0	-10.0	57.8	16.2	9	48	1.46	15°	213
66	-13.5	7.0	-10.0	57.8	16.2	10	49/1	1.46	20°	216
67	-13.5	7.0	-10.0	57.8	16.2	11	50/2	1.46	25°	219
68	-13.5	7.0	-10.0	57.8	16.2	7	45	1.96	5°	222
69	-13.5	7.0	-10.0	57.8	16.2	8	44	1.96	10°	225
70	-13.5	7.0	-10.0	57.8	16.2	9	43	1.96	15°	228
71	-13.5	7.0	-10.0	57.8	16.2	10	42	1.96	20°	231
72	-13.5	7.0	-10.0	57.8	16.2	11	41	1.96	25°	234
73	-13.5	7.0	-10.0	57.8	16.2	7	36	2.75	5°	237
74	-13.5	7.0	-10.0	57.8	16.2	8	37/1	2.75	10°	240
75	-13.5	7.0	-10.0	57.8	16.2	9	38	2.75	15°	243
76	-13.5	7.0	-10.0	57.8	16.2	10	39	2.75	20°	246
77	-13.5	7.0	-10.0	57.8	16.2	11	40	2.75	25°	249
78	-18.8	14.4	-25.0	87.2	23.7	12	15/1	0.6	5°	252
79	-18.8	14.4	-25.0	87.2	23.7	13	14/2	0.6	10°	255
80	-18.8	14.4	-25.0	87.2	23.7	14	13	0.6	15°	258
81	-18.8	14.4	-25.0	87.2	23.7	15	12	0.6	20°	261
82	-18.8	14.4	-25.0	87.2	23.7	16	11	0.6	25°	264
83	-18.8	14.4	-25.0	87.2	23.7	12	6	0.9	5°	267
84	-18.8	14.4	-25.0	87.2	23.7	13	7	0.9	10°	270
85	-18.8	14.4	-25.0	87.2	23.7	14	8	0.9	15°	273
86	-18.8	14.4	-25.0	87.2	23.7	15	9	0.9	20°	276
87	-18.8	14.4	-25.0	87.2	23.7	16	10	0.9	25°	279
88	-18.8	14.4	-25.0	87.2	23.7	12	5	1.10	5°	282
89	-18.8	14.4	-25.0	87.2	23.7	13	4/1*	1.10	10°	285
90	-18.8	14.4	-25.0	87.2	23.7	19	4 *	1.10	10°	288
91	-18.8	14.4	-25.0	87.2	23.7	14	3	1.10	15°	291
92	-18.8	14.4	-25.0	87.2	23.7	15	2 +	1.10	20°	294
93	-18.8	14.4	-25.0	87.2	23.7	16	1/2+	1.10	25°	297
94	-18.8	14.4	-25.0	87.2	23.7	17	1+	1.10	25°	300

^{*} Run 4/1 was repeat of run 4 with improved oil consistency + Run 1 is repeat of 1/2 with porous tunnel walls

INDEX OF DATA FIGURE (Concluded)

Figure	δeL	δe _R	δ _R δ _S	B δ _{BF}	Dataset Identifier	Run No.	Mach No.	Angle of Attack	Page
95	-18.8	14.4	-25.0 87.	2 23.7	12	16	1.25	5°	303
96	-18.8	14.4	-25.0 87.		13	17	1.25	10°	306
97	-18.8	14.4	-25.0 87.		14	18	1.25	15°	309
98	-18.8	14.4	-25.0 87.		15	19	1.25	20°	312
99	-18.8	14.4	-25.0 87.		16	20	1.25	25°	315
100	-18.8	14.4	-25.0 87.		12	25	1.46	5°	318
101	-18.8	14.4	-25.0 87.		13	24	1.46	10°	321
102	-18.8	14.4	-25.0 87.		14	23	1.46	15°	324
103	-18.8	14.4	-25.0 87.		15	22	1.46	20°	327
103	-18.8	14.4	-25.0 87.		16	21	1.46	25°	330
105	-18.8	14.4	-25.0 87.		12	26/1	1.96	5°	333
	-18.8	14.4	-25.0 87.		13	27	1.96	10°	336
106	-18.8	14.4	-25.0 87.		14	28	1.96	15°	339
ກ 107		14.4	-25.0 87. -25.0 87.		15	29	1.96	20°	342
108	-18.8	14.4	-25.0 87. -25.0 87.		16	30	1.96	25°	345
109	-18.8				12	35	2.75	5°	348
110	-18.8	14.4			13	34	2.75	10°	351
111	-18.8	14.4	-25.0 87.		14	33	2.75	15°	354
112	-18.8	14.4	-25.0 87.				2.75	20°	357
113	-18.8	14.4	-25.0 87.		15	32		25°	360
114	-18.8	14.4	-25.0 87.	2 23.7	16	31/ 3	2.75	25	300

NOMENCLATURE General

SYMBOL	PLOT SYMBOL	DEFINITION
а		speed of sound; m/sec, ft/sec
$C_{\mathbf{p}}$	CP	pressure coefficient; $(p_l - p_{\infty})/q$
М	масн	Mach number; V/a
р		pressure; N/m ² , psf
Q	Q(NSM) Q(PSF)	dynamic pressure; $1/2\rho V^2$, N/m^2 , psf
RN/L	RN/L	unit Reynolds number; per m, per ft
٧		velocity; m/sec, ft/sec
α	ALPHA	angle of attack, degrees
β	BETA	angle of sideslip, degrees
ψ	PSI	angle of yaw, degrees
ϕ	PHI	angle of roll, degrees
ρ		mass density; kg/m ³ , slugs/ft ³
	Refe	rence & C.G. Definitions
Ab		base area; m ² , ft ²
b	BREF	wing span or reference span; m, ft
c.g.		center of gravity
$m{\ell}_{ ext{REF}}$	LREF	reference length or wing mean aerodynamic chord; m, ft
s	SREF	wing area or reference area; m^2 , ft^2
	MRP	moment reference point
	XMRP	moment reference point on X axis
	YMRP	moment reference point on Y axis
	ZMRP	moment reference point on Z axis
SUBSCRIPTS	3	
b l s t		base local static conditions total conditions
ω		free stream.

NOMENCLATURE Control Surface Deflections

Symbol	Plot Symbol	Definition
⁸ BF	BDFLAP	bodyflap deflection angle, degrees
δ e L	ELV-L	left elevon deflection angle, degrees
^δ eR	ELV-R	right elevon deflection angle, degrees
δR	RUDDER	rudder deflection angle, degrees
δ _{SB}	SPDBRK	speedbrake deflection angle, degrees

CONFIGURATIONS INVESTIGATED

The test article was the 0.004-scale Model 74-0 of the Configuration 4 (Modified) Space Shuttle Vehicle Orbiter. The model components are listed below, and model dimensional data are given in Table 3.

The model surfaces were specially prepared for application of thin-film Prussian. blue oil paint and linseed oil mixtures for flow-visualization photography.

Control-surface deflections were set as indicated in Table 2 to provide various degrees of flow-turbulence and asymmetrical circulation. No configuration build-up or alternate component programs were carried out. The following nomenclature was used to describe the configuration:

B ₆₂	Fuselage, per VL70-000202C, VL70-000200B, VL70-000203
c ₁₂	Canopy, per VL70-000202C
R_5	Rudder/speedbrake, per VL70-000146A
¥8	Vertical tail, per VL70-000146A
W ₁₂₇	Wing, per VL70-000200B, VL70-006092, VL70-006089
E ₄₃	Elevons, per VL70-000200B
F ₁₀	Bodyflap, per VL70-000200B, VL70-000140C
N ₂₈	OMS nozzles
M ₁₆	OMS/RCS pods, per VL70-008410, VL70-8401

TEST PROCEDURE

The model-surface preparations and oil-paint applications were carried out basically according to the techniques established in References a and c.

Before each new model configuration was tested, the model was finished and cleaned, and all gaps, knicks, slots, counterbores, and non-flush screwheads were filled with polyester body-filler or a similar compound. Final smoothing was done with very fine-grain abrasives.

Several coats of a white lacquer were then applied, with a final wellfinished set of clear-lacquer coats.

A mixture of standard artist's Prussian blue oil paint and linseed oil was used in the flow-visualization itself. Varying mixtures were required for each Mach number and Reynolds number condition for optimal photogenic and flow characteristics.

After each blow (run), during which side-view motion pictures were taken as required, still photographs of the top, right side, and left side of the orbiter were made. These are the primary data for test OA131.

DISCUSSION OF RESULTS

This test was notable for its success in determination of boundary-layer and local surface-level flow directions, as shown in Figures 3 through 114. These flow-pattern indications have proved useful in alleviating concerns about APU exhaust recirculation.

Motion picture photographic results were not particularly amenable to studies of flow-pattern development, in part because of limited resolution due to the film size used.

Extensive review of the data photographs indicated that local flow-directions about the aft fuselage, as affected by the late-design short OMS pods, were determinable for transonic and low supersonic conditions. No reverse-flow, forward-travelling streams were apparent. Suspicions concerning unusual flow out of the orbiter base region forward along the fuselage were generally dismissed.

Clear delineation of vortex and boundary-layer separation zones was also apparent, and the basic surface-level flow-vectors were visible on the fuselage, wing, and vertical tail.

REFERENCES

- a) IL SAS/WTO/74-368, "Model Design Requirements for Model 74-0 for Test OA131," 7-12-74.
- b) IL SAS/AERO/74-369, "Wind Tunnel Test Requirements for Test OA131 (Vehicle 5 Flow Visualization)," 5-29-74.
- c) DMS-DR-2042, (IA52), "Results of Flow Visualization Studies in the NASA/MSFC 14 x 14-Inch Trisonic Wind Tunnel on a .004-Scale Model (34-0) Space Shuttle Orbiter and Integrated Vehicle," 3-12-74.

TEST : OA131			DATE : 9/12-26/74
	TEST CON	IDITIONS	
			- _T
MACH NUMBER	REYNOLDS NUMBER (per feet)	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)
0.60	5.0 x 10 ⁶	4.35	100
0.90	6.2 x 10 ⁶	7.36	100
1.10	6.6 x 10 ⁶	9.29	100
1.25	6 7 x 10 ⁶	11.48	100
1.46	6.5 x 10 ⁶	9.47	100
1.96	7.0 x 10 ⁶	10.20	100
2.75	5.2 x 10 ⁶	6.38	100
BALANCE UTILIZED:	None		
	CAPACITY:	ACCURACY:	COEFFICIENT
	ONI NOTET.	AUGUMAUT.	TOLERANCE:
NF			
.SF			-
AF			
PM			
RM		-	
YM		. 	
COMMENTS:			

DATA SET	ومروا والموارية الموارك والموارك والموا	sc	CHD	PAR	AMETE	RS/V	ALUES	NO.	MA	CH NUMBERS	(OR AL	TERNA	TE IND	EPENDI	ENT VAI	RIABLE	ì
ENTIFIER	CONFIGURATION		β						SBF	0.6	0.9	1.10	1.25	1.46	1.96	2.75	
I	B62C12E43F10M16N28R5V8W127	6	0	F.9		0	0				93	92	91	94			
2		5	П							75	76	85	86	95	104	105/1	
3		10								74/	1 77	84	87	96/	103	106/1	
4		15								73	78	83	88	97	102	107/5	,
5		20								72	79	82	89	98	101/2	108	
<		25		1	V				V	71	80	81	90/1		100		
7		15	П	-13.5	7.	-10.	57.8		16.2	66/		56	55	46/1	45	36	
8		10	П			Π				67/		57	54	47	44	37/1	
9		15						Ì		68	63	58	53	48	143	38	
10		20		1						69	62	59	52	491	-	39	
1/		25	П		V	A	•			70		60/	151	50/2	41	40	
12		5		-188	14.4	-25	87.2	1	23.7	15/	, 6	5	16	25	26/1	35	
13		10		Ti					1	14/2		4/1	17	24	27	34	
14		15								1.13	8	3	18	23	28	33	
15		20								12	9	2	19	22		32	
16	V .	25									10	1/2	20	21	30	31/3	
17	MODEL 74-0 WITH POECUS	25	,						+								
				1													
7	13 19			25		31		37		13	49	55		61		67	
للبيلا	والرج والمساحدون			_نا				سيل	لبب	لينبيا		بنلب		سيا		سبل	•

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TABLE II. - Concluded.

DATA SET	DAI31	SC					ALUES	NO.			N SUMM		TERNA	TE INDE	PENDE	NT VAF	RIABLE)		-
DENTIFIER	CONFIGURATION	α	β	SeL	Ser	SR	8se	OF RUNS	28t								2.75		
18	B62C12E43F10M16N28R5V8W1				-0.7		0		- 1					90					
19		-125			14,4	-2.5	87.Z		23.7				4						
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							4.0												~
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<u> </u>	7 13 19			25	· · · · · ·	31	· · · · · · · · · · · · · · · · · · ·	37		43	49		55		61		67		7
لمعيد	بالمستحدث	لسبي	لـــا	سنسا		111	DEFFI	بنك		Li	ىلىب	سب	ىلى	سلس	حبيا	AR (1)	IDVAR	لند	Ļ

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TABLE III MODEL DIMENSIONAL DATA

MODEL COMPONENT: BODY - B		
) ·	
GENERAL DESCRIPTION: Configuration 1400	Corbiter fuse	lage. MCR
200-R ₄ . Similar to 140A/B fuselage excep	ot aft body re	vised and
improved. Midbldy wing-boot fairing, X	= 940 to X =	1040.
MODEL SCALE: 0.0040		
DRAWING NUMBER VL70-000140C, -00 VL70-000200B, -00		5A
DIMENSION:	FULL SCALE	MODEL SCALE
Length (IML: Fwd Sta. X =238), In. Length (OML: Fwd Sta. X =235), In.	1290.3 1293.3	5.161 5.173
Max Width (@ $x_0 = 1528.3$), In.	264.0	1.056
Max Depth ($@X = 1464$), In.	250.0	1.000
Fineness Ratio	4.899	4.899
Area - Ft ²		
Max Cross-Sectional	340.885	0.0055
Planform		
Wetted		
Base		

MODEL COMPONENT:	CANOPY - C		
	1.2	7.	
GENERAL DESCRIPTION:	Configuration 1400	C orbiter canopy	, vehicle
cabin No. 31 updated	d to MCR 200-R4. Us	sed with Fuselage	B B C C C C C C C C C C C C C C C C C C
MODEL SCALE: 0.004	· · · · · · · · · · · · · · · · · · ·		·
DRAWING NUMBER	VL70-000140	OC, VL70-000202B	, -000204
DIMENSION:	i de la Marijana Postala	FULL SCALE	MODEL SCALE
Length(X ₀ =434.64	43 to 578), In.	143.357	0.573
Max Width(@ X	= 513.127), In.	152.412	0.610
Max Depth (@ Z	= 501 to 449.39),	In. 51.61	0.206
Fineness Ratio		**************************************	
Area			
Max Cross-Sec	ctional	1	
Planform			
Wetted			
Base			•

MODEL COMPONENT: RUDDER - R	•	
GENERAL DESCRIPTION: Configuration 140C or	biter rudder (:	identical to
CONFIGURATION A/B rudder).		
MODEL SCALE: 0.004		
DRAWING NUMBER: VL70-000146B0	000095	
DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area - Et ²	100.15	0.0016
Span (equivalent) , $_{ m In}.$	201.00	0.804
Inb'd equivalent chord, In.	91.585	0.366
Outb'd equivalent chord, In.	50.833	0.203
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	0.400	0.400
At Outb'd equiv. chord	0.400	0.400
Sweep Back Angles, degrees	•	
Leading Edge	34.83	34.83
Tailing Edge	26.25	26.25
Hingeline (Product of Area & c)	34.83	34.83
Area Moment (Normatix tox hingax Mine), Ft3	610.92	0.0004
Mean Aerodynamic Chord, In.	73.2	0.293

MODEL COMPONENT: VERTICAL - V8		
GENERAL DESCRIPTION: Configuration 140C orbit	ter vertical	tail (identical
to configuration 140A/B vertical tail).		
MODEL SCALE: 0.004		
DRAWING NUMBER: VL70-000140C, -000146B	· · · · · · · · · · · · · · · · · · ·	
DIMENSIONS:	FULL SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo) - Ft ² Planform Span (Theo) - In. Aspect Ratio Rate of Taper Taper Ratio Sweep-Back Angles, Degrees. Leading Edge Trailing Edge O.25 Element Line Chords: Root (Theo) WP Tip (Theo) WP MAC Fus. Sta. of .25 MAC W.P. of .25 MAC B.L. of .25 MAC	413.253 315.72 1.675 0.507 0.404 45.000 26.25 41.13 268.50 108.47 199.81 1463.35 635.52	0.0066 1.263 1.675 0.507 0.404 45.000 26.25 41.13 1.074 0.434 0.799 5.853 2.542
Airfoil Section Leading Wedge Angle - Deg. Trailing Wedge Angle - Deg. Leading Edge Radius	10.00 14.92 2.00	10.00 14.92 0.008
Void Area	13.17	0.0002
Blanketed Area	0.0	_0.0

TABLE III. (Continued)

MODEL COMPONENT: WING-W		
GENERAL DESCRIPTION: Configuration 1400 orbiter wi	ng. MCR 200-R,	similar to 140A 'B
wing W116 but with refinements: improved wing-bo	ot-midbody fairi	$ng (X_0 = 940 to$
X = 1040): elevon split line relocated from Y =	281 to Y = 315	5.2.
MODEL SCALE: 0.004		
TEST NO.	DWG. NO. VL70	-000140C, -000200B
DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area (neo.) Planform Span (Theo In. Aspect Ratio Rate of Taper Taper Ratio Dihedral Angle, degrees Incidence Angle, degrees Aerodynamic Twist, degrees Sweep Back Angles, degrees Leading Edge Trailing Edge O.25 Element Line Chords: Root (Theo) B.P.O.O. Tip, (Theo) B.P. MAC Fus. Sta. of .25 MAC W.P. of .25 MAC B.L. of .25 MAC	2690.00 936.68 2.265 1.177 0.200 3.500 0.500 3.000 45.000 -10.056 35.209 689.24 137.85 474.81 1136.83 290.58 182.13	0.043 3.747 2.265 1.177 0.200 3.500 0.500 3.000 45.000 -10.056 35.209 2.757 0.551 1.899 4.547 1.162 0.729
EXPOSED DATA Area (Theo) Ft ² Span, (Theo) In. BP108 Aspect Ratio Taper Ratio Chords Root BP108	1751.50 720.68 2.059 0.245 562.09	0.028 2.883 2.059 0.245 2.248
Tip 1.00 b MAC Fus. Sta. of .25 MAC W.P. of .25 MAC B.L. of .25 MAC Airfoil Section (Rockwell Mod NASA)	137.85 392.83 1185.98 294.30 251.77	0.551 1.531 4.744 1.177 1.007
XXXX-64 Root b =	0.113	0.113
Tip b =	0.120	0.120
Data for (1) of (2) Sides Leading Edge Cuff Planform Area Ft2	113.18	0,0018
Leading Edge Intersects Fus M. L. @ Sta Leading Edge Intersects Wing @ Sta 20	500.'0 1024.0	<u>2.000</u> <u>4.096</u>

MODEL COMPONENT: SLOTTED ELEVON (6-INCH G	AP) - E	
GENERAL DESCRIPTION: Configuration 140A/B	orbiter elevor	; 1.
NOTE: E ₄₃ is a slotted version of E ₂₆ . D	ata are for one	side.
MODEL SCALE: 0.004		
DRAWING NUMBER: VI.70-000200, -00	6089, -006092	
DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area - Ft ²	210.0	0.820
Span (equivalent), In.	349.2	1.397
Inb'd equivalent chord , In.	118.004	0.472
Outb'd equivalent chord , In.	55.192	0.221
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	0.2096	0.2096
At Outb'd equiv. chord	0.4004	_0.4004
Sweep Back Angles, degrees		
Leading Edge	0.00	0.00
Tailing Edge	-10.056	- 10.056
Hingeline	0.00	0.60
(Product of Area & c) Area Moment (Normalxtochingexline), Ft ³	1587.25	0 0001
Mean Aerodynamic Chord, In.	90.7	0.363

MODEL COMPONENT: BODY FLAP - F			
,	•		
GENERAL DESCRIPTION: Configuration 1400	body flap.	Hingeline	
located at X = 1532, Z = 287.			
MODEL SCALE: 0.004			
DRAWING NUMBER VL70-000140C, -355114			
DIMENSION:	FULL SCALE	MODEL SCALE	
Length (X ₀ =1525.5 to X ₀ =1613), In.	87.,50	0.350	
Max Width (@ L.E., $X_0 = 1525.5$), In.	256.00	1.024	
Max Depth (@ $X_{0} = 1532$), In.	19.798	0.792	
Fineness Ratio			
Area - Ft ²			
Max Cross-Sectional (@ H.L.)	35.196	0.00056	
Planform	135.00	0.0022	
Wetted			
Base $(X_0 = 1613)$	4.89	0.000078	

NERAL DESCRIPTION: Configuration 140A/R or	rbiter OMS No	zzles.
		~
		· · · · · · · · · · · · · · · · · · ·
ODEL SCALE: 0.0040		
RAWING NUMBER: <u>VL70-000140A</u> (Location),	SS-A00106, R	el. 5. (Conto
DIMENSIONS:	FULL SCALE	MODEL SCALE
MACH NO.		
Length - In. Gimbal Point to Exit Plane Throat to Exit Plane		
Diameter - In. Exit Throat Inlet		
Area - ft ² Exit Throat		
Gimbal Point (Station) - In. Left Wapan Nozzle		
χ _ο Υ _ο Ζ _ο	1518.00 - 88.0 492.	6.072 - 0.352 1.968
Right X Nozzles X O Y O Z O	1518.00 88.00 492.00	6.072 0.352 1.968
Null Position - Deg. Left Upper Nozzle Pitch Yaw	15°49' 12°17'	15°49' 12°17'
Right Lower Nozzle Pitch Yaw	15°40' 12°17'	15°49' 12°17'

TABLE III. (Concluded)

MODEL COMPONENT: OMS POD - M		
	¥	
GENERAL DESCRIPTION: Configuration 1400	orbiter OMS po	od - short
pod		
MODEL SCALE: 0.004		
DRAWING NUMBER VL70-008401, V	L70-008410	
DIMENSION:	FULL SCALE	MODEL SCALE
Length (OMS Fwd Sta X _o =1310.5), In.	258.50	1.034
Max Width (At $X_0 = 1511$), In.	136.8	0.547
Max Depth (At $X_0 = 1511$), In.	74.70	0.299
Fineness Ratio	2.484	2.484
Area - Ft ²		
Max Cross-Sectional	58.864	0.0094
Planform	La company of the com	
Wetted	A	· · · · · · · · · · · · · · · · · · ·
Base		

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Figure 1. Axis Systems

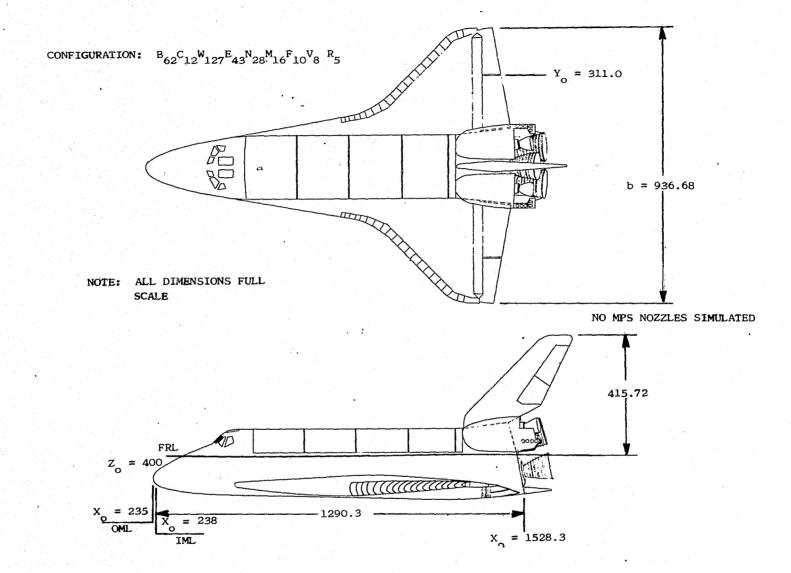
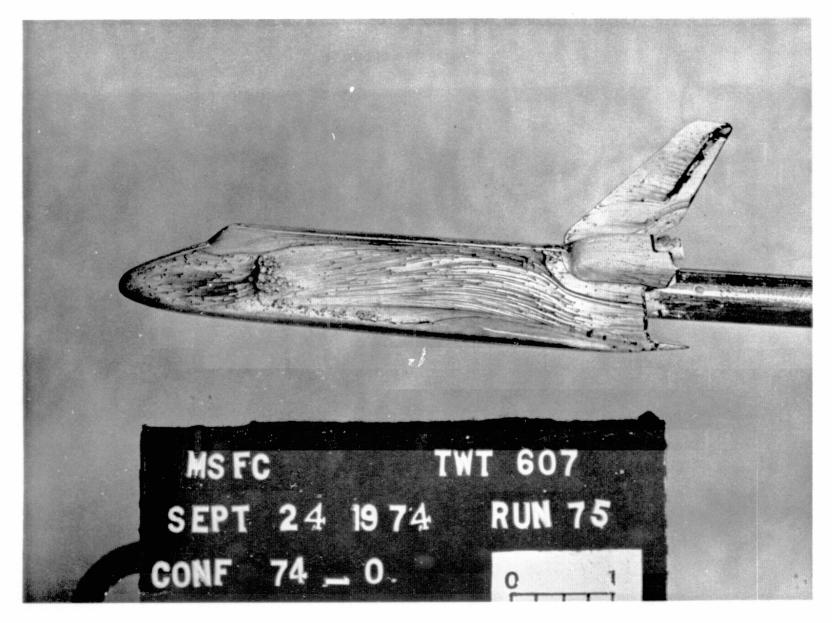


Figure 2. - Vehicle 4 (modified) orbiter as simulated by model 74-0 for test series OA 131.



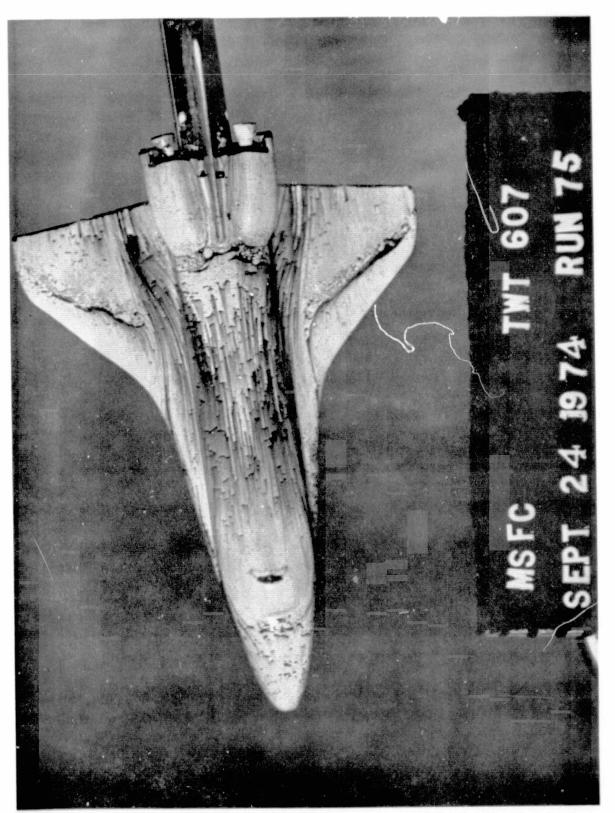
a. Right side view

Figure 3. - ELV-L = -0.9ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 5° MACH = 0.6



b. Left side view

Figure 3. - Continued.



0

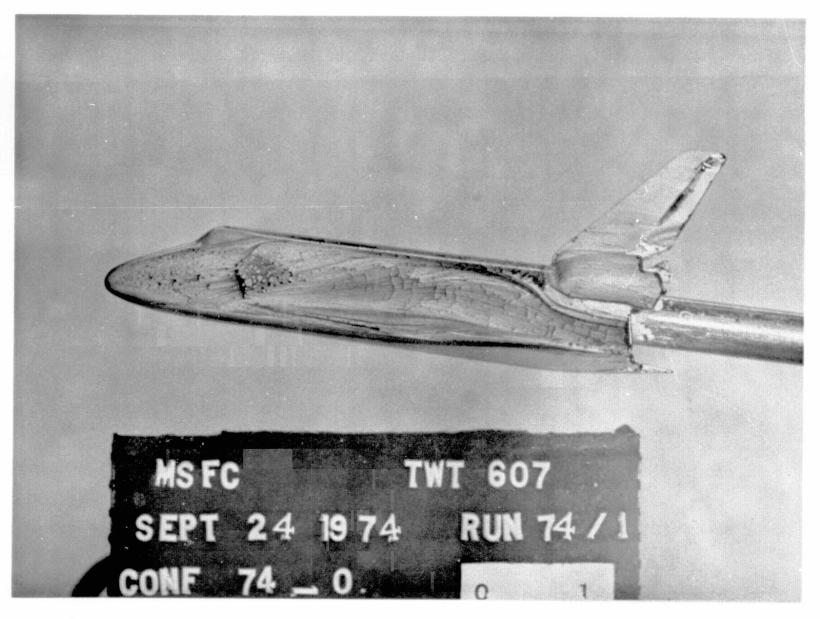
c. Top view

Figure 3. - Concluded.



a. Right side view

Figure 4. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 $ALPHA = 10^{\circ} MACH = 0.6$



b. Left side view

Figure 4. - Continued.

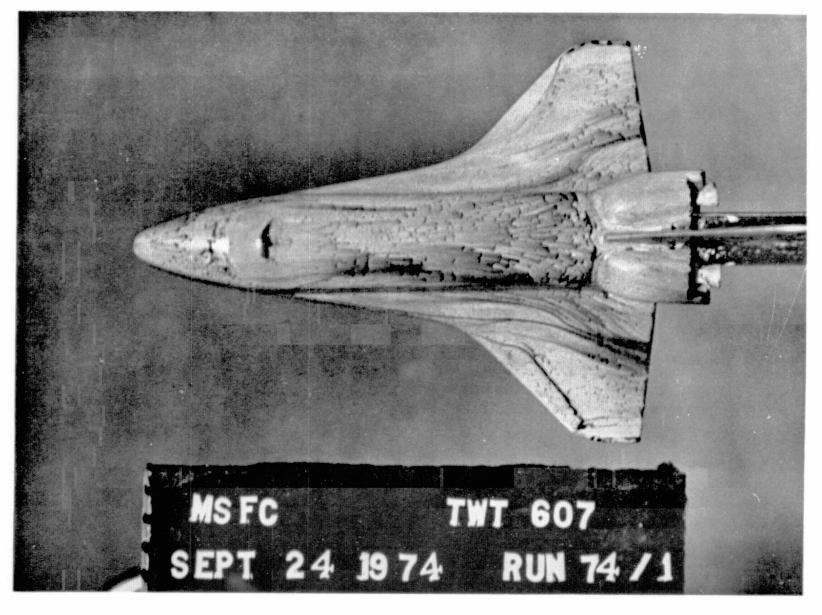
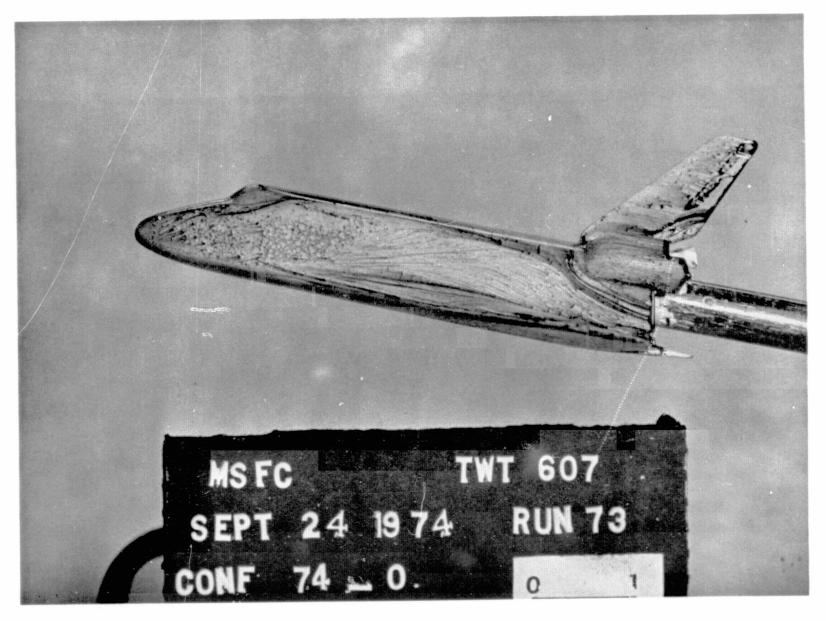


Figure 4. - Concluded.



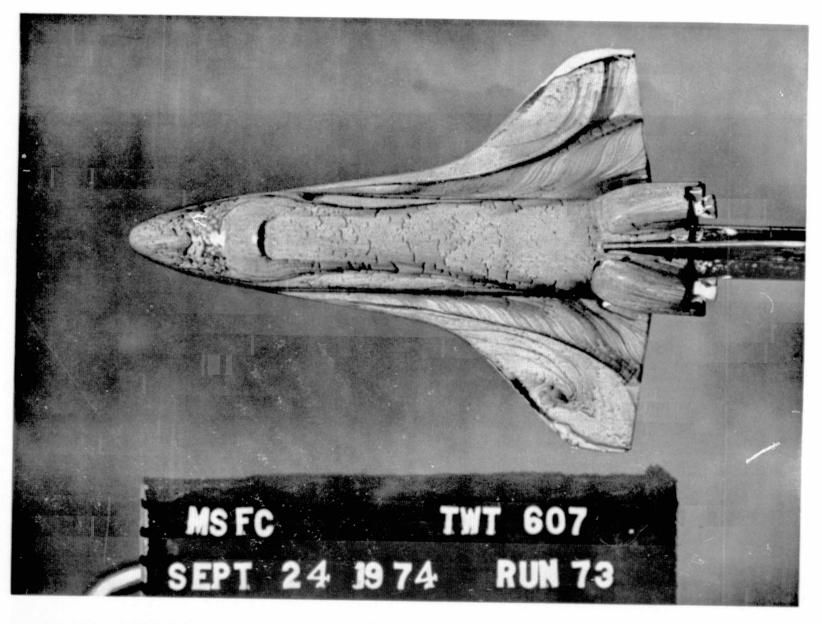
a. Right side view

Figure 5. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 15° Mach = 0.6



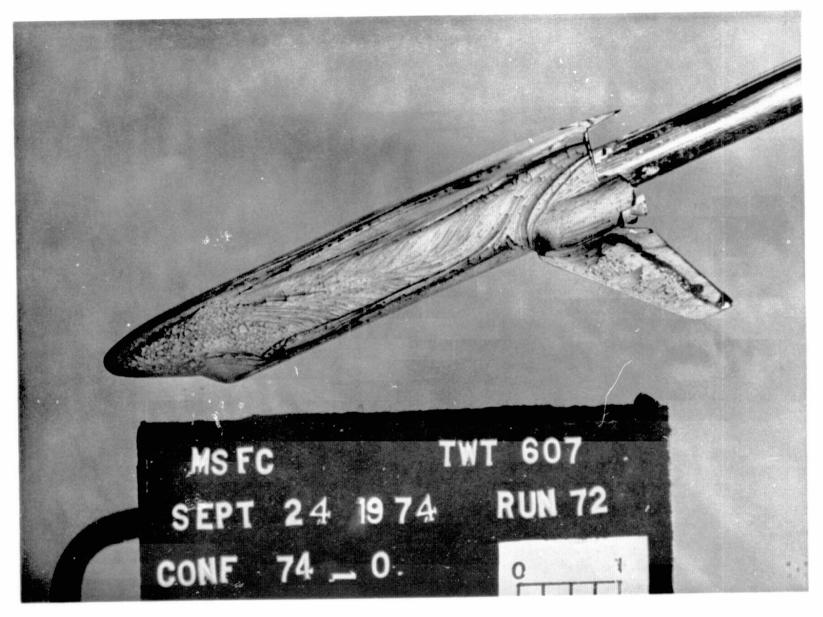
b. Left side view

Figure 5. - Continued.



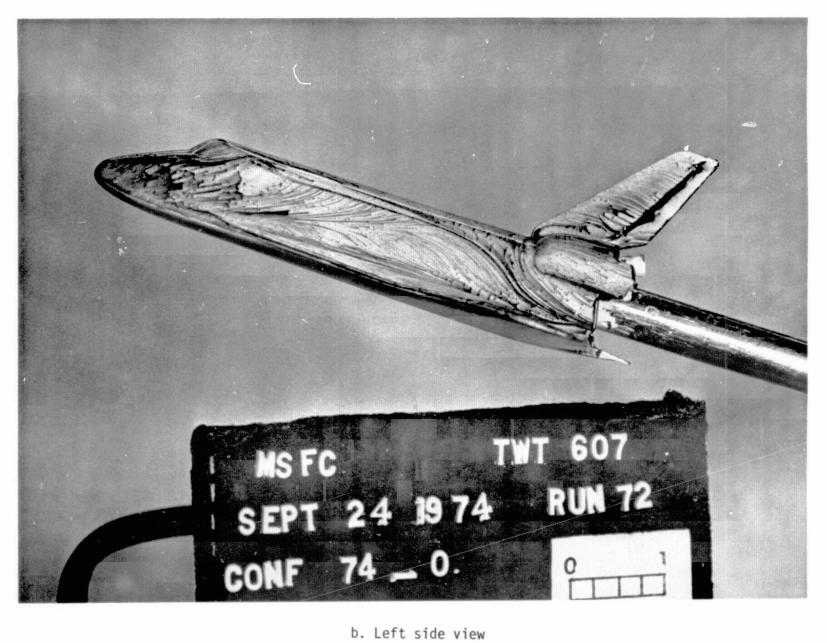
c. Top view

Figure 5. - Concluded.



a. Right side view

Figure 6. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 20° MACH = 0.6



b. Left side view

Figure 6. - Continued.

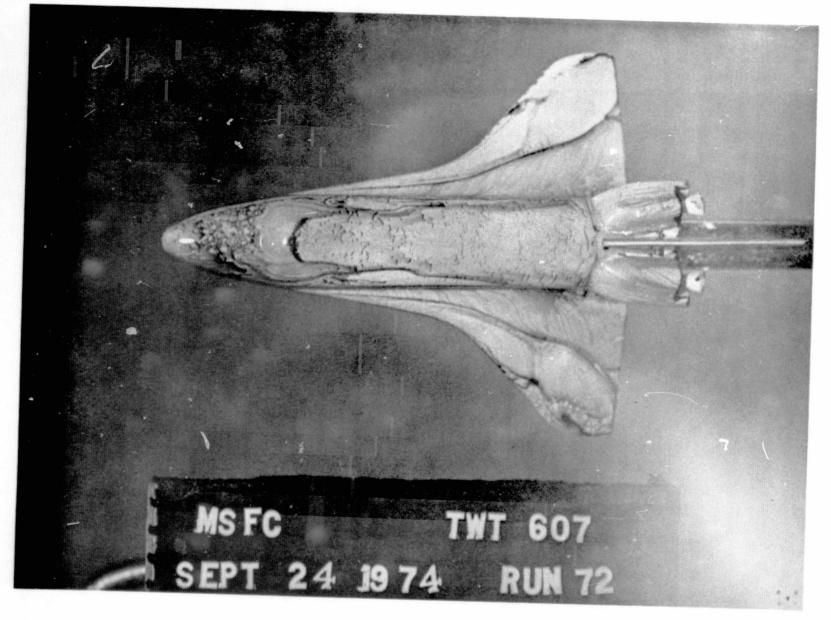
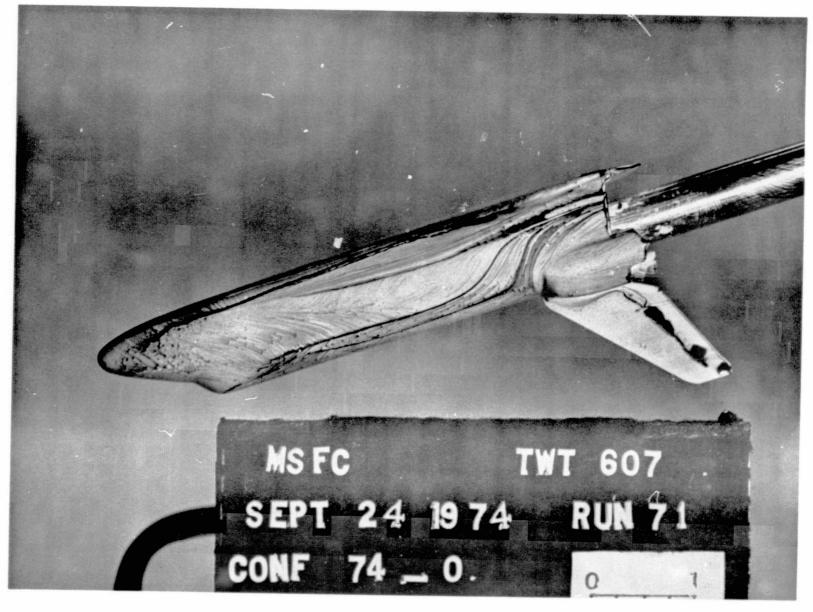
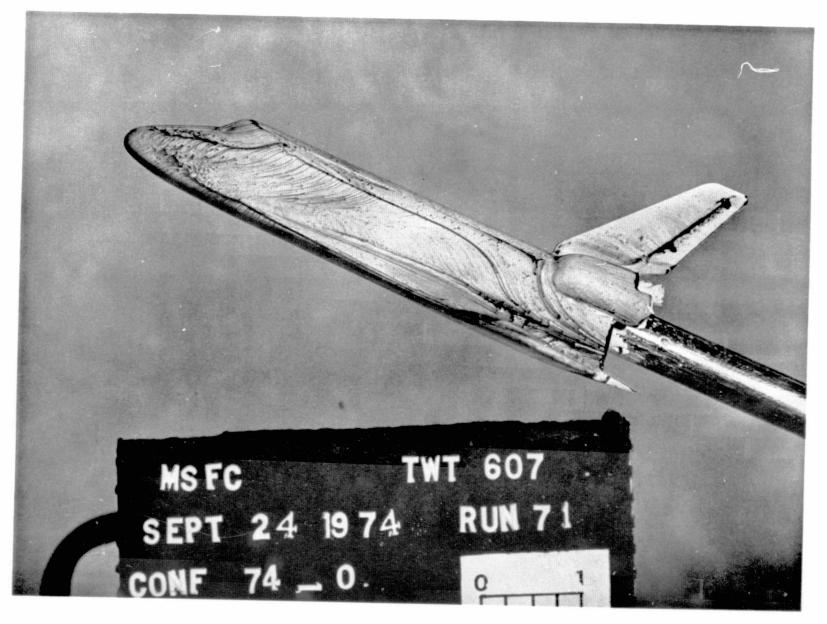


Figure 6. - Concluded.



a. Right side view

Figure 7. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 25° MACH = 0.6

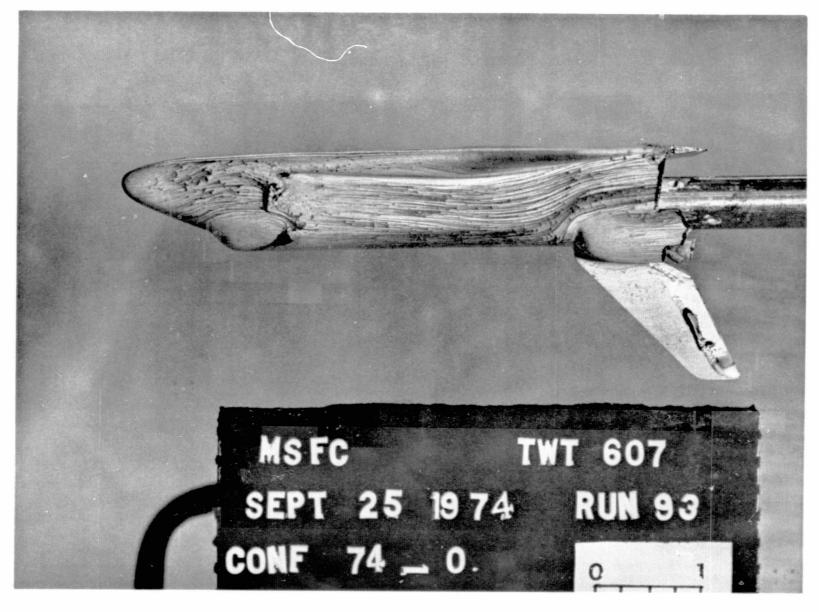


b. Left side view

Figure 7. - Continued.

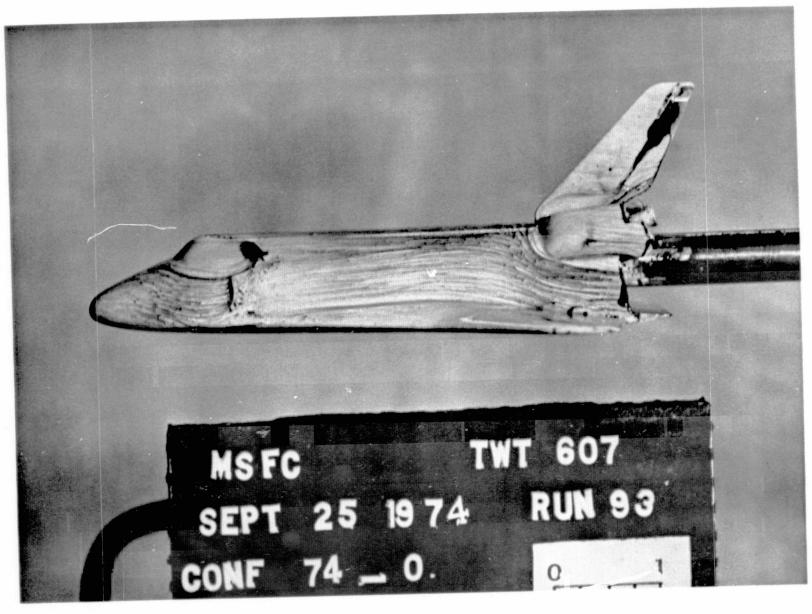


Figure 7. - Concluded.



a. Right side view

Figure 8. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 $ALPHA = 0^{\circ} MACH = 0.9$



b. Left side view

Figure 8. - Continued.

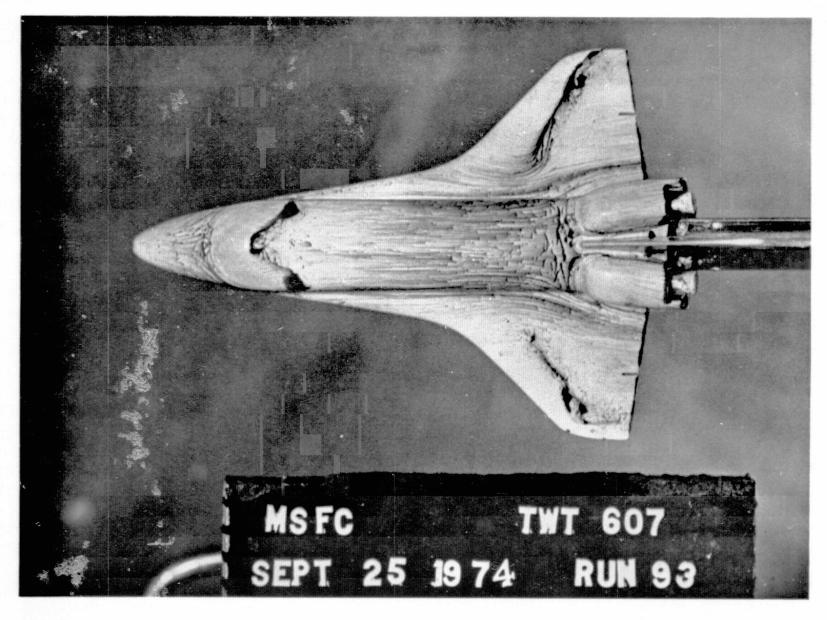
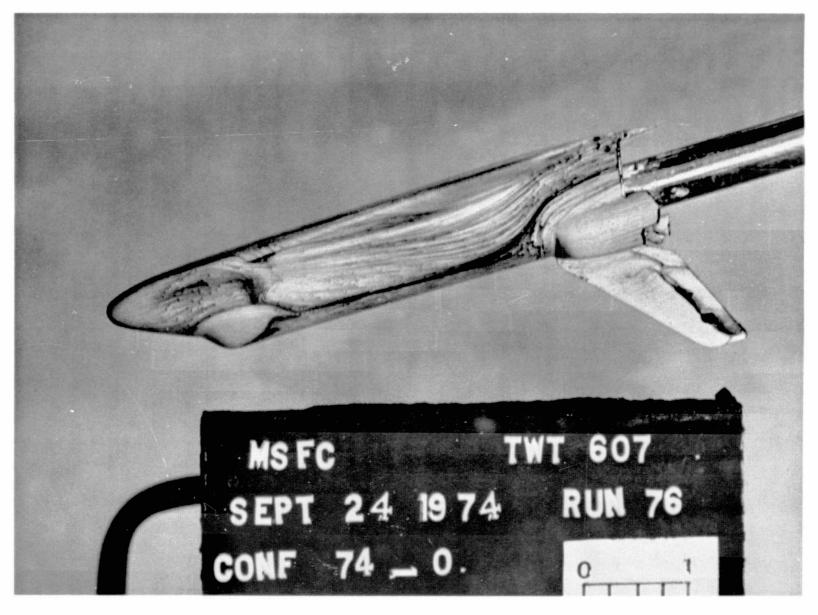
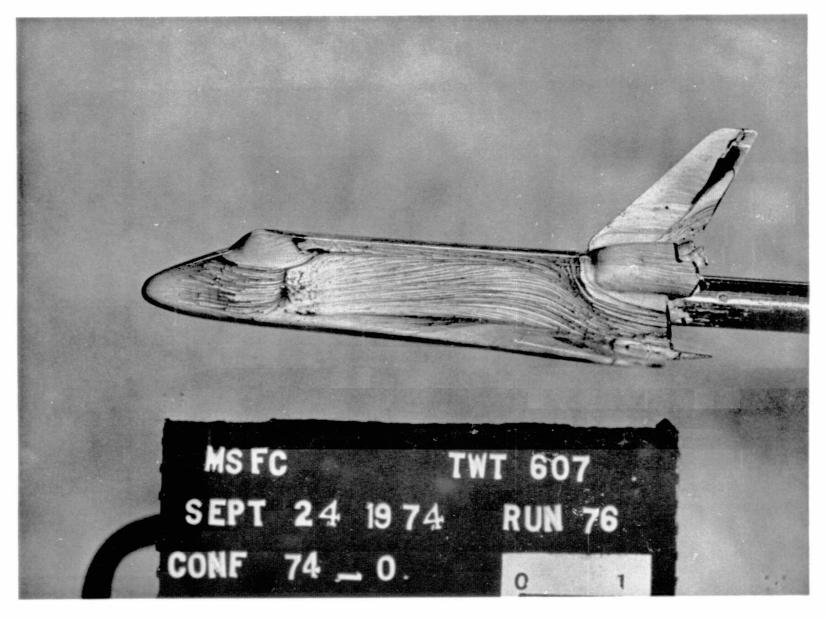


Figure 8. - Concluded.



a. Right side view

Figure 9. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 5° MACH 0.9



b. Left side view

Figure 9. - Continued.

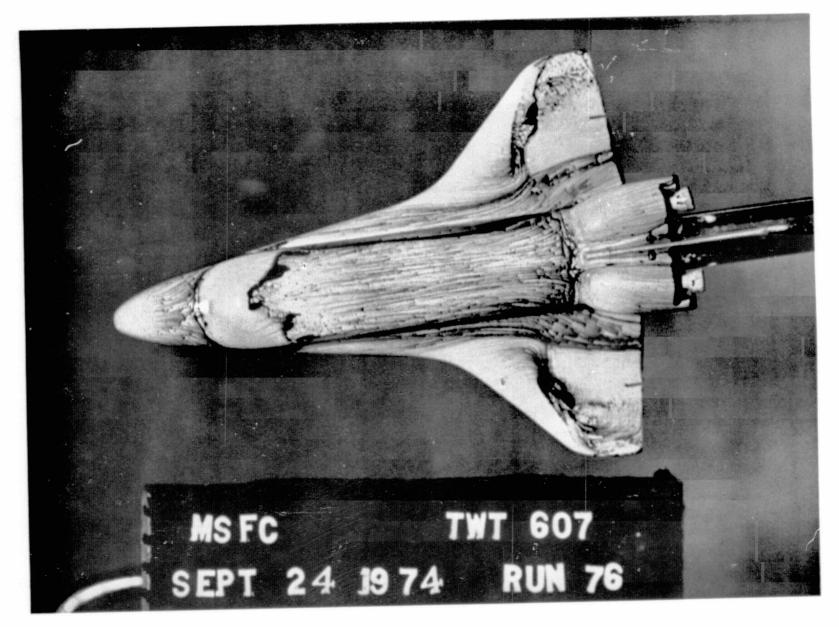
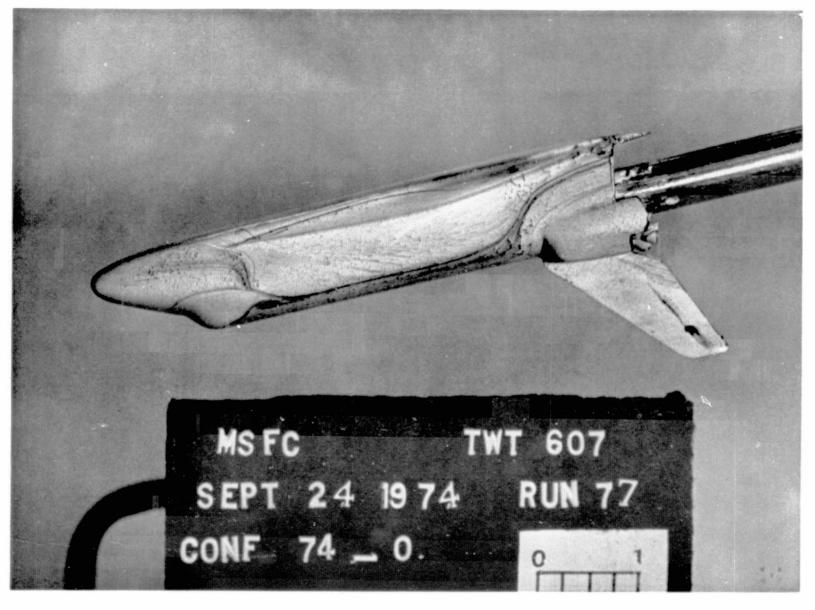


Figure 9. - Concluded.



a. Right side view

Figure 10._ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 10° MACH = 0.9

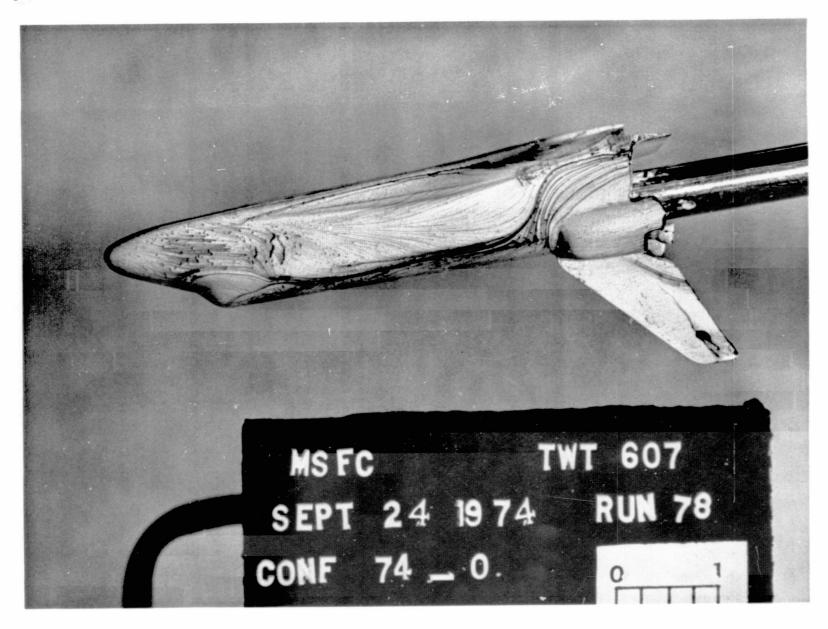


b. Left side view

Figure 10. - Continued.

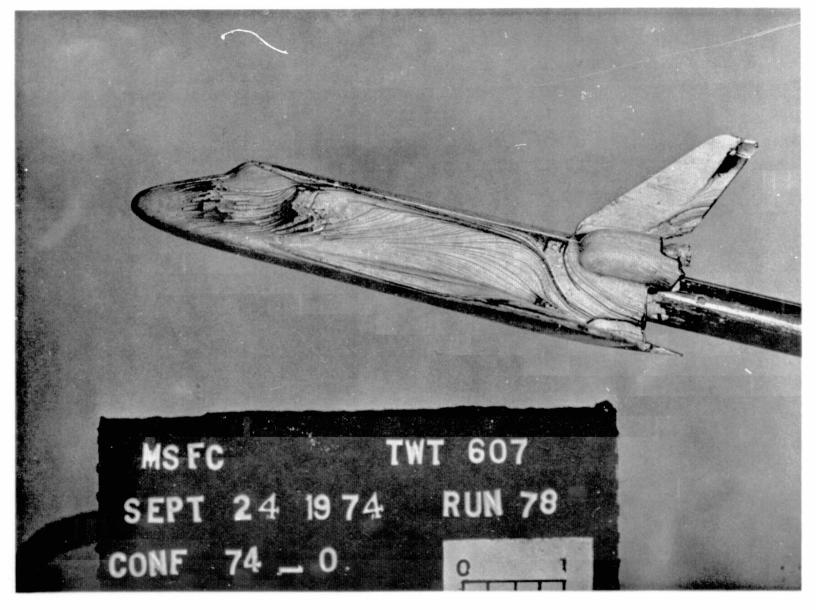


Figure 10. - Concluded.



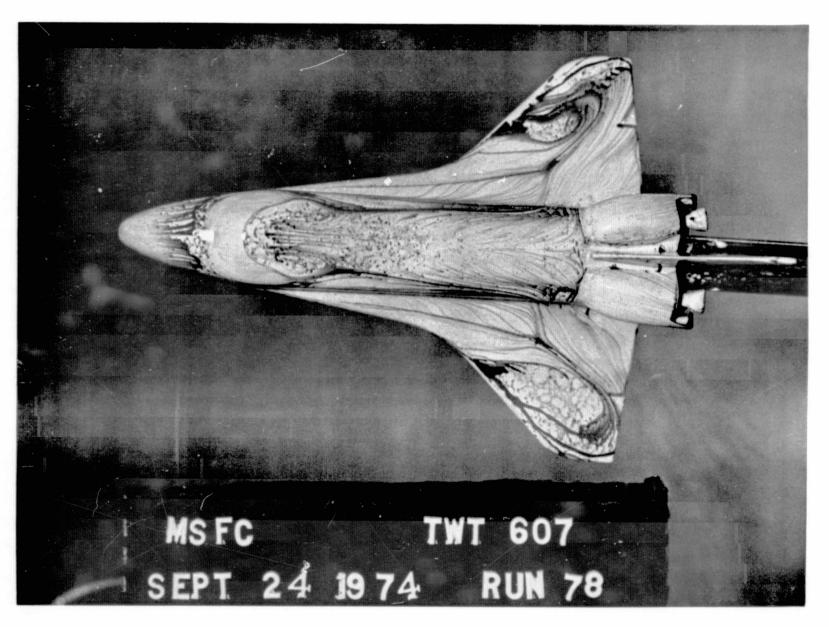
a. Right side view

Figure 11.-ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 15° MACH = 0.9



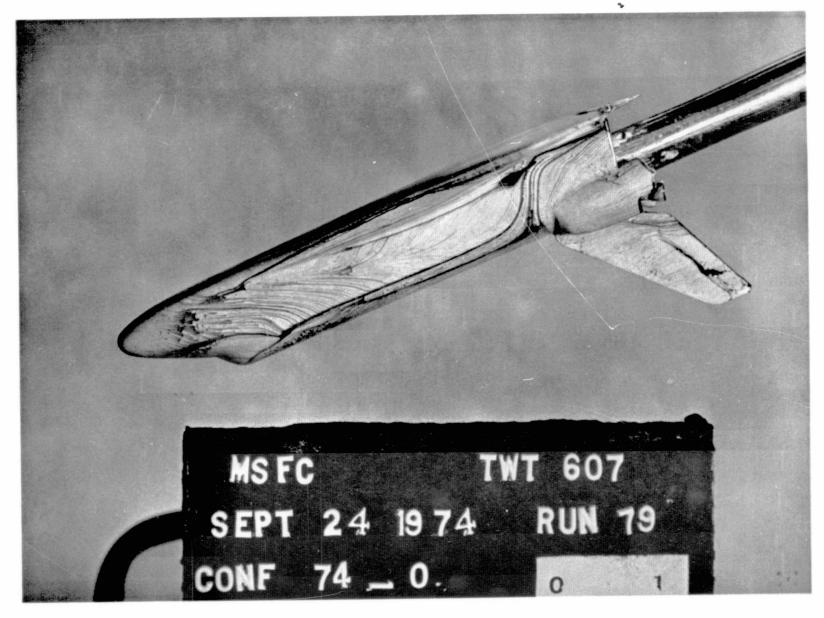
b. Left side view

Figure 11. - Continued.



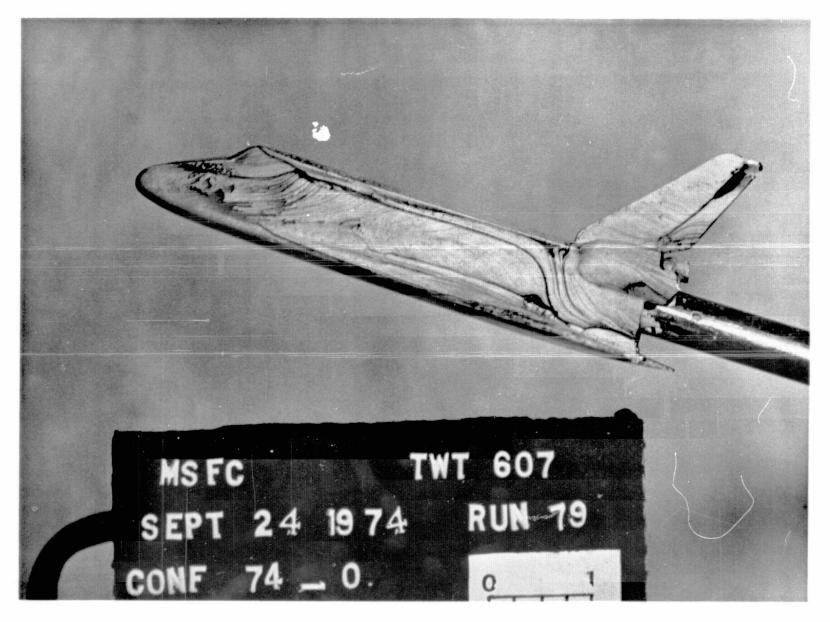
c. Top view

Figure 11. - Concluded.



a. Right side view

Figure 12.- ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 20° MACH = 0.9



b. Left side view

Figure 12. - Continued.

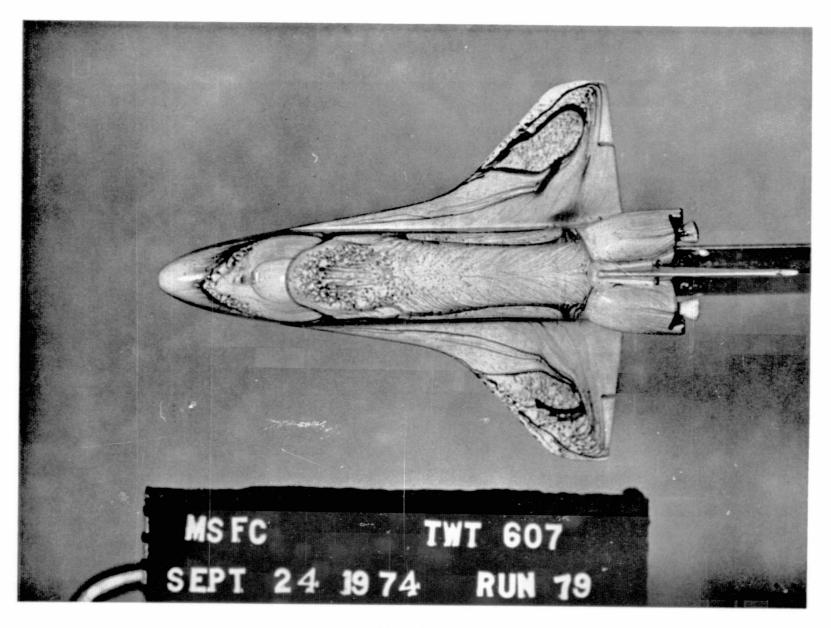
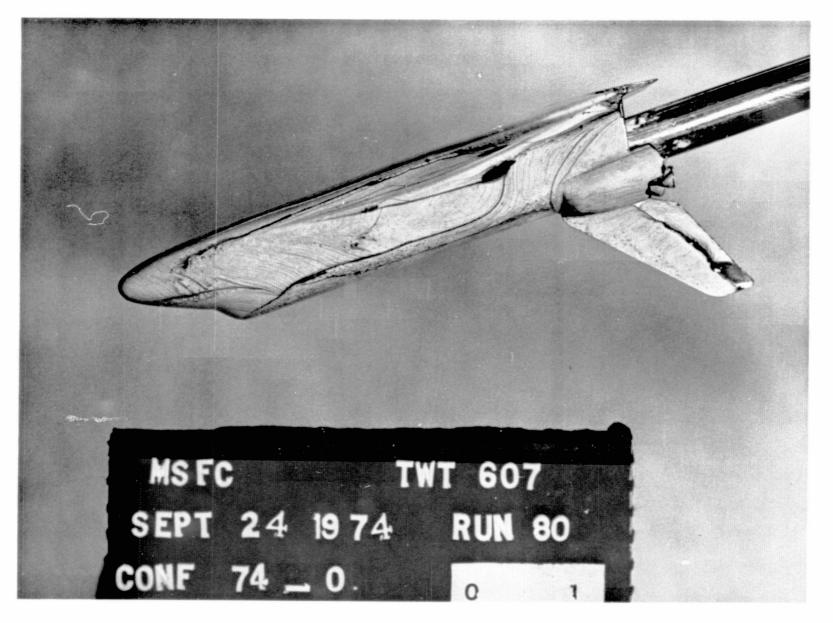


Figure 12. - Concluded.



a. Right side view

Figure 13. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 25° MACH = 0.9



b. Left side view

Figure 13. - Continued.

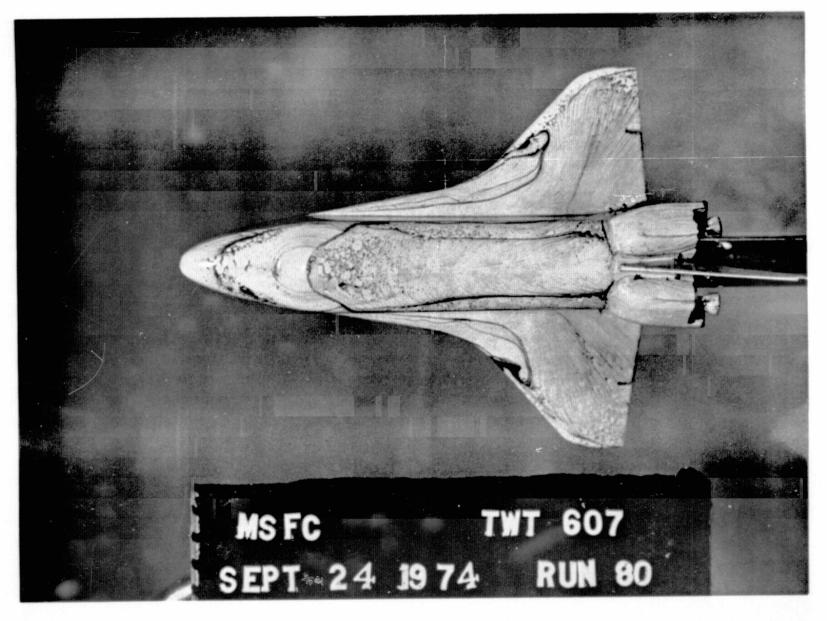
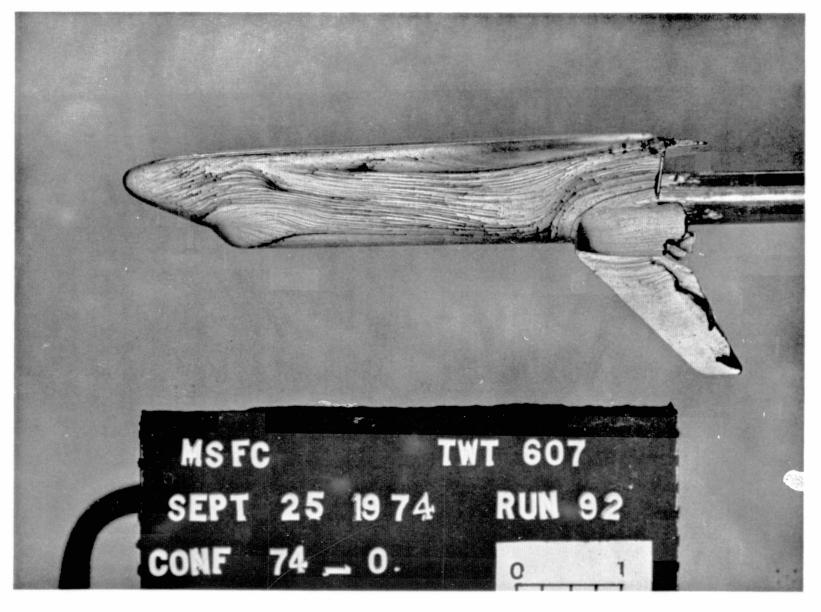


Figure 13. - Concluded.



a. Right side view

Figure 14. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 0° MA.CH = 1.10



b. Left side view

Figure 14. - Continued.

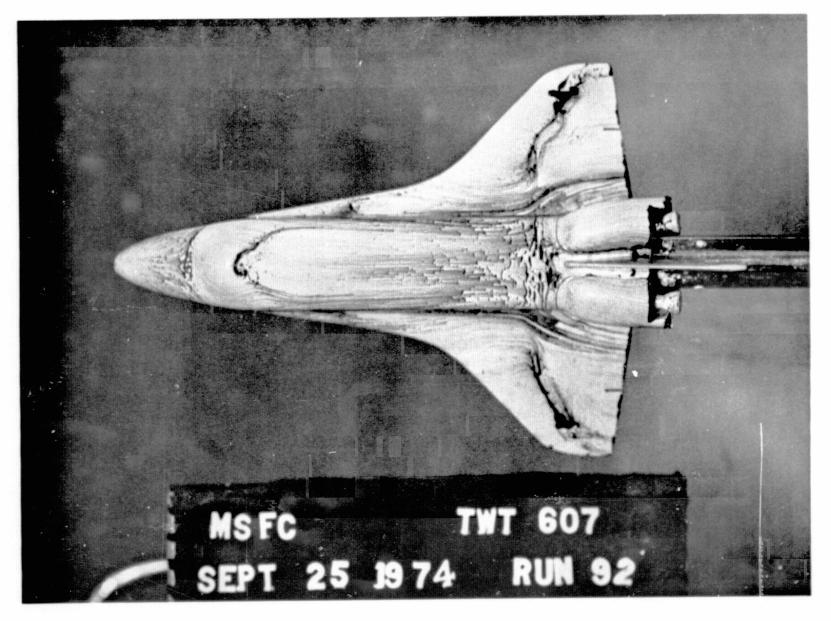
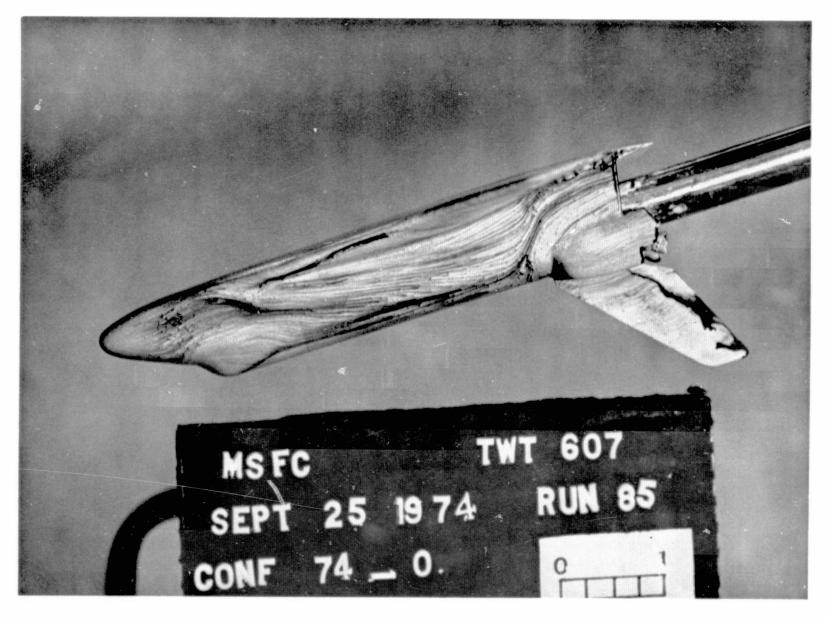
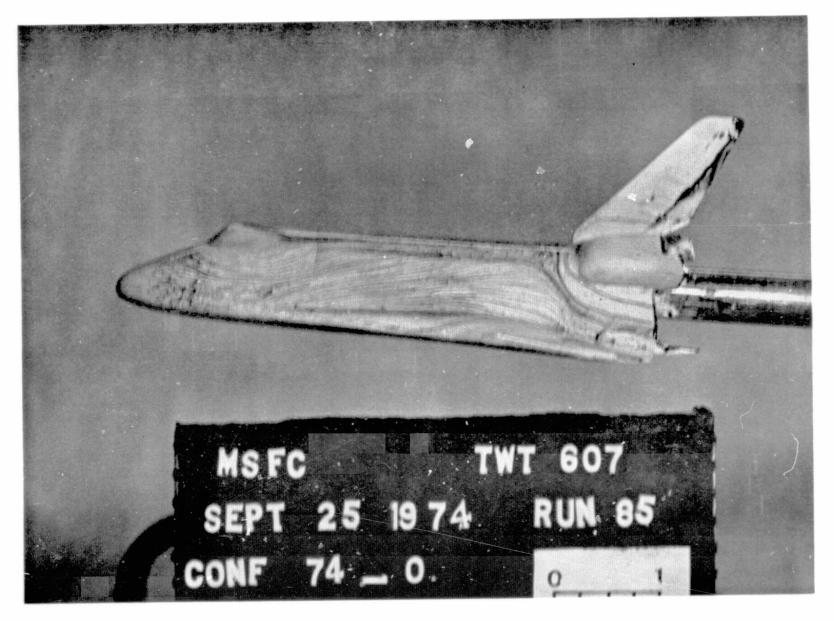


Figure 14. - Concluded.



a. Right side view

Figure 15. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 5° MACH = 1.10



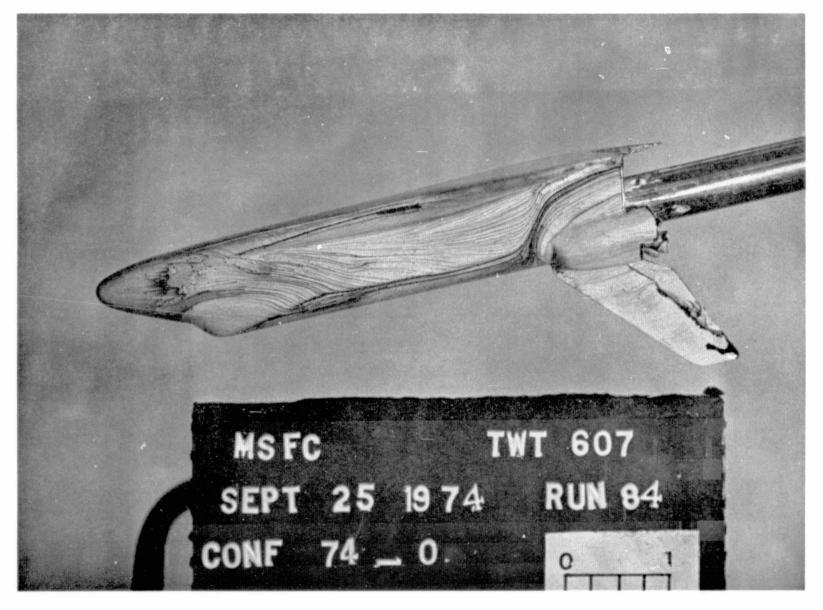
b. Left side view

Figure 15. - Continued.



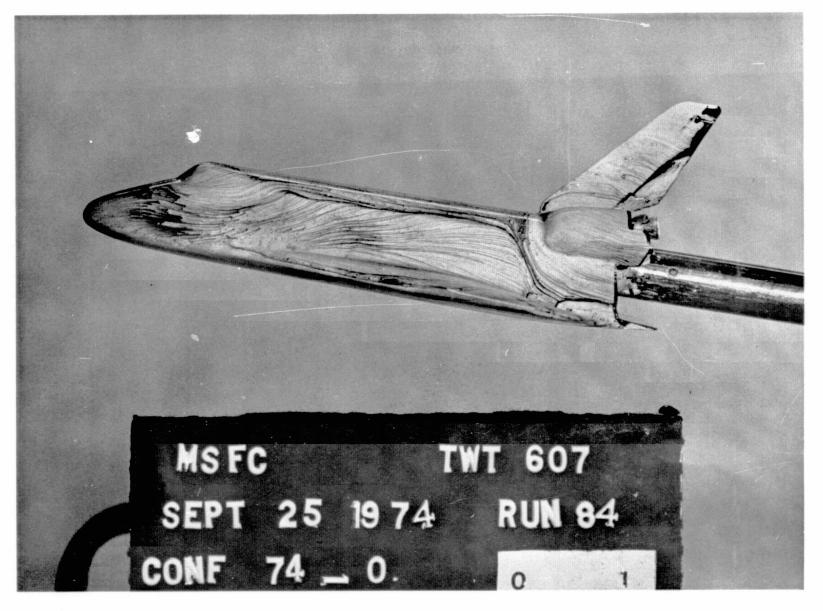
c. Top view

Figure 15. - Concluded.



a. Right side view

Figure 16. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 10° MACH = 1.10



b. Left side view

Figure 16. - Continued.

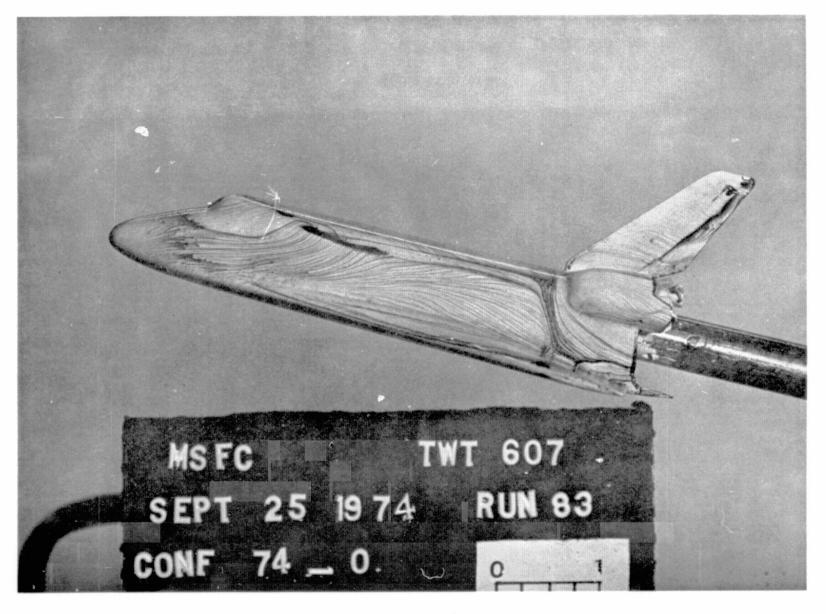


c. Top view

Figure 16. - Concluded.

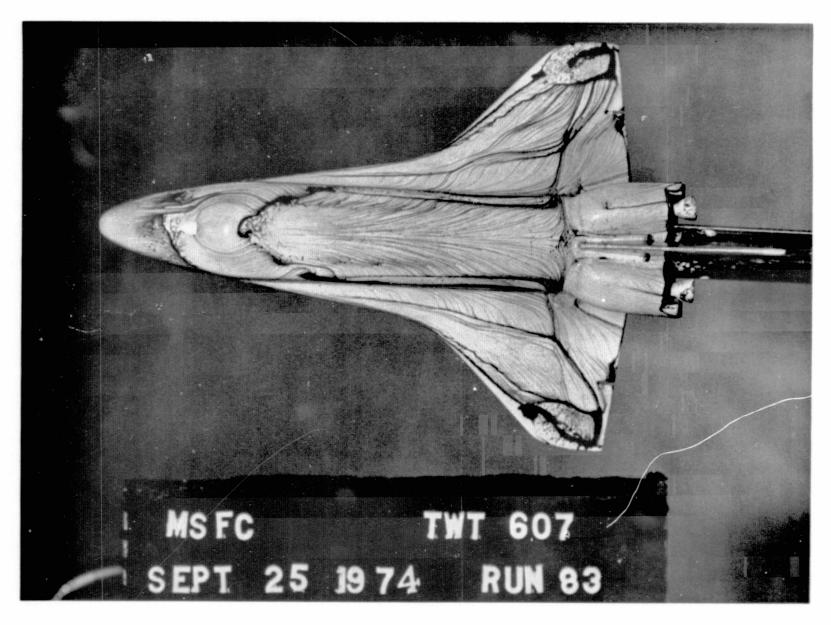


Figure 17. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 15° MACH = 1.10



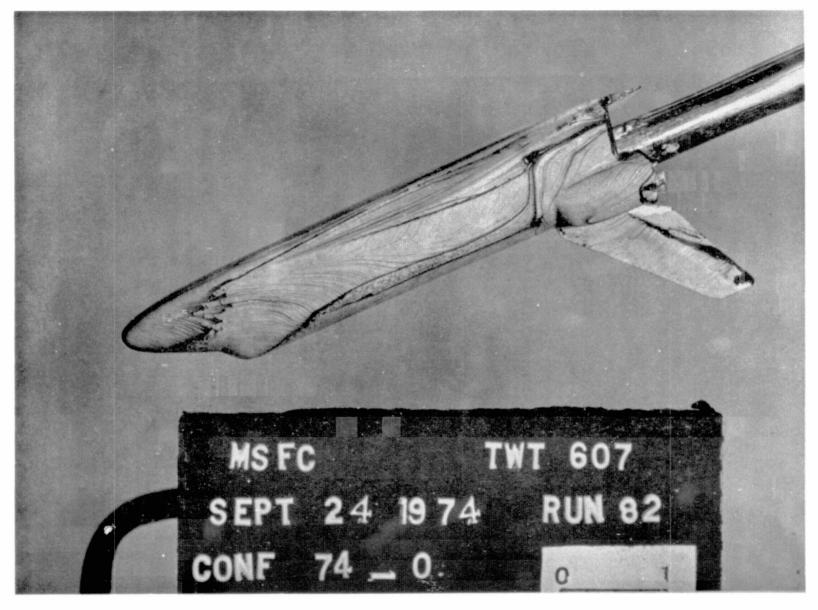
b. Left side view

Figure 17. - Continued.



c. Top view

Figure 17. - Concluded.



a. Right side view

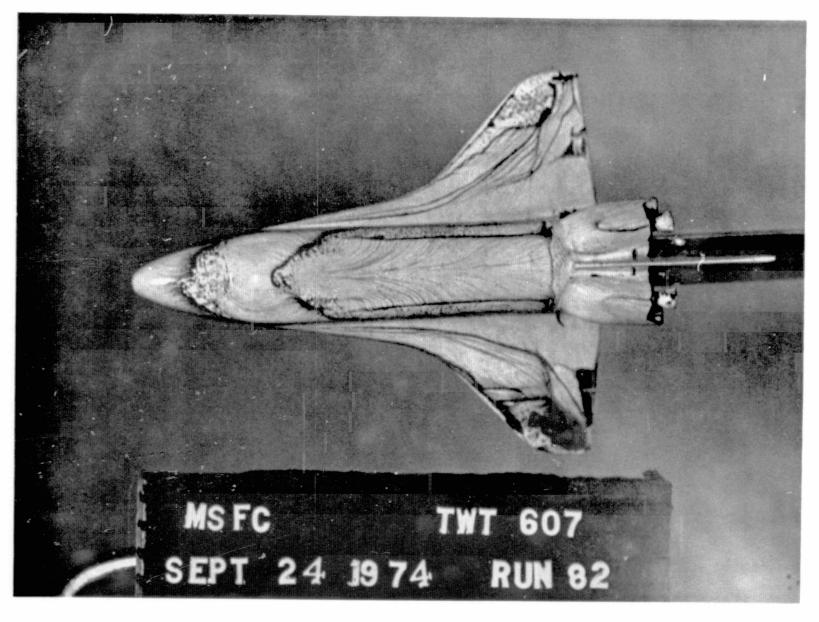
Figure 18. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 20° MACH = 1.10

T.



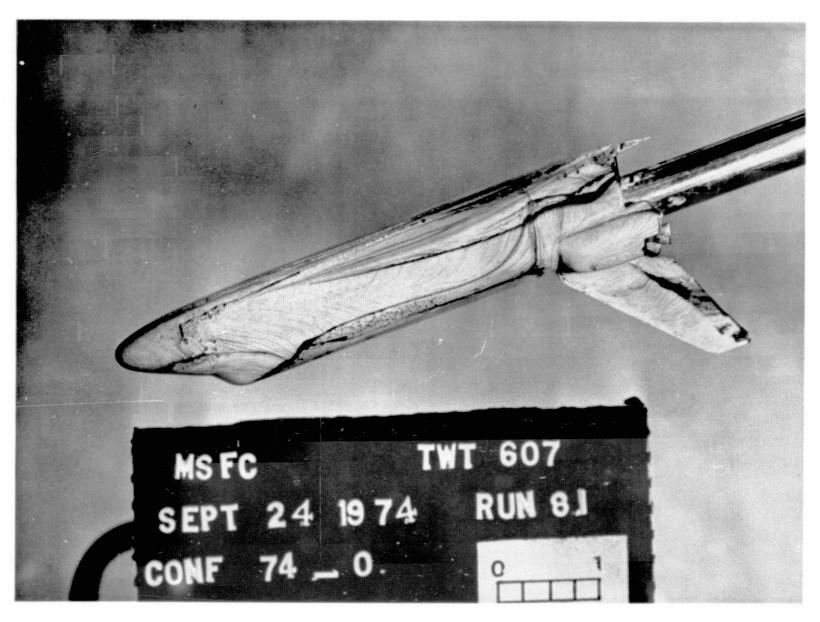
b. Left side view

Figure 18. - Continued.



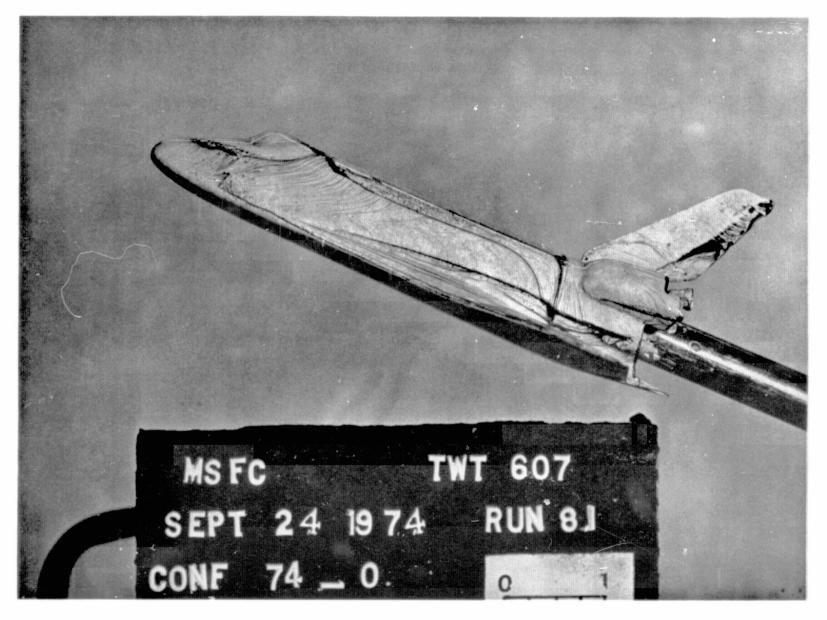
c. Top view

Figure 18. - Concluded.



a. Right side view

Figure 19. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0. ALPHA = 25° MACH = 1.10

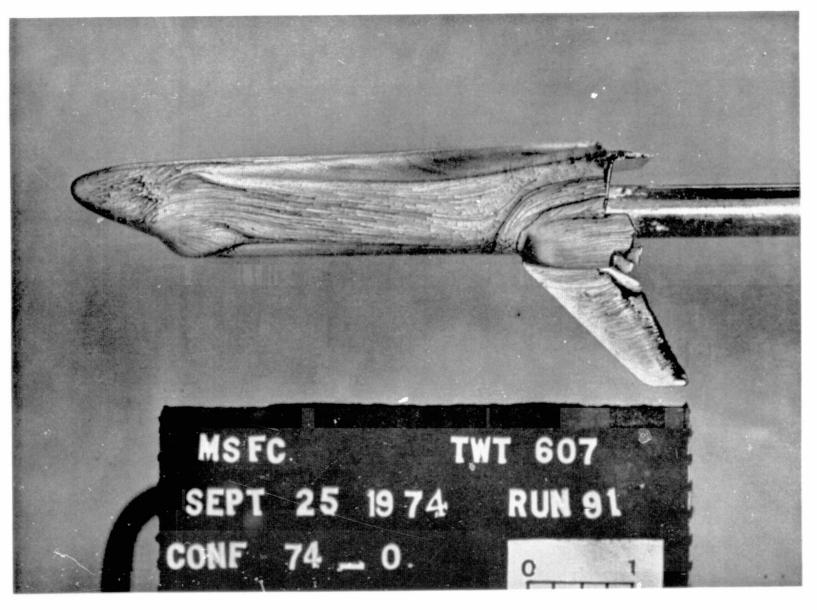


b. Left side viewFigure 19. - Continued.



c. Top view

Figure 19. - Concluded.



a. Right side view

Figure 20. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 0 $^{\circ}$ MACH = 1.25



b. Left side view

Figure 20. - Continued.



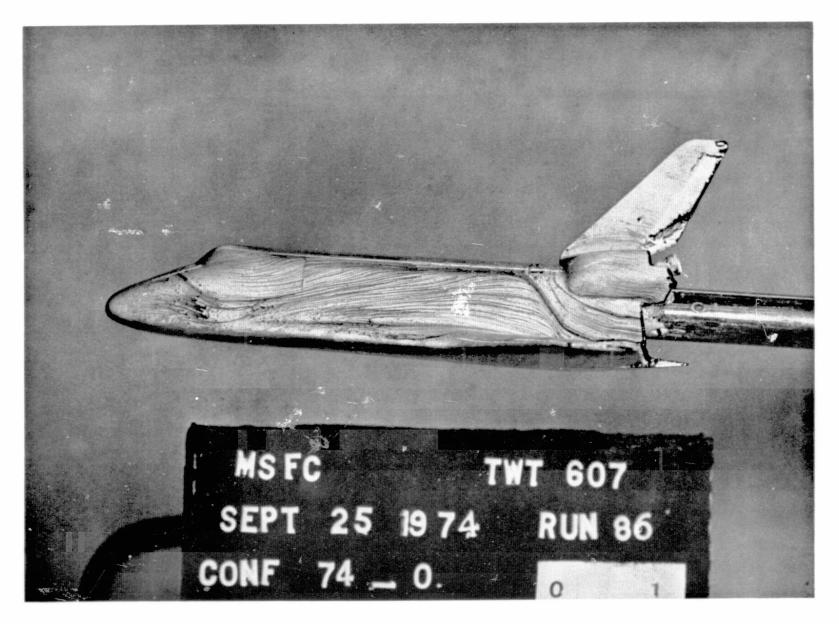
c. Top view

Figure 20. - Concluded.



a. Right side view

Figure 21. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 5° MACH = 1.25



b. Left side view

Figure 21. - Continued.

()



c. Top view

Figure 21 - Concluded.

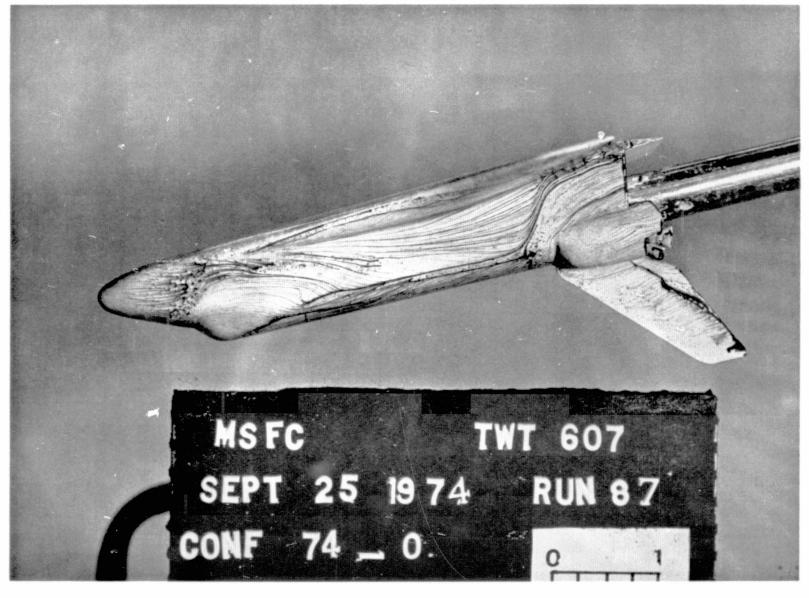


Figure 22. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 10° MACH = 1.25



b. Left side view

Figure 22. - Continued.



Figure 22. - Concluded.



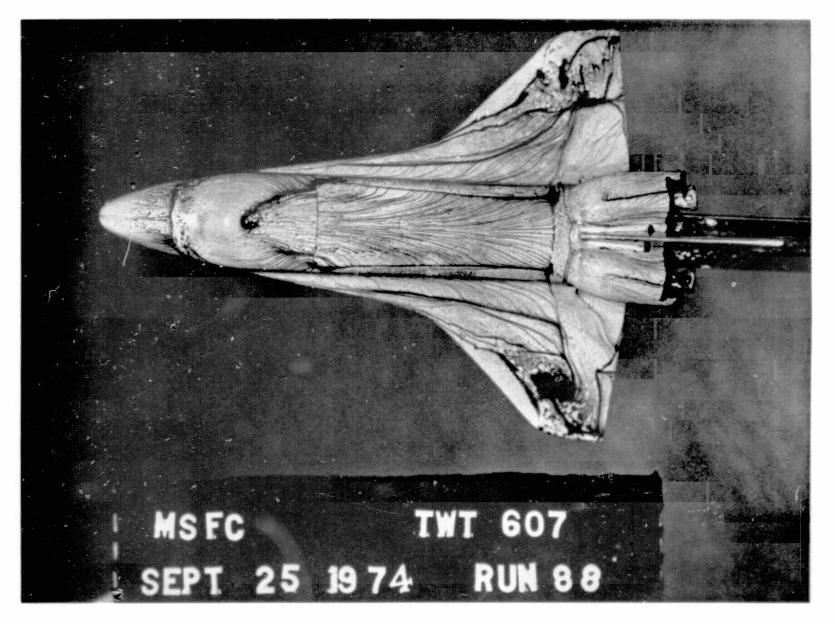
a. Right side view

Figure 23. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 15° MACH = 1.25



b. Left side view

Figure 23.- Continued.



c. Top view

Figure 23. - Concluded.



a. Right side view

Figure 24. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 20° MACH = 1.25



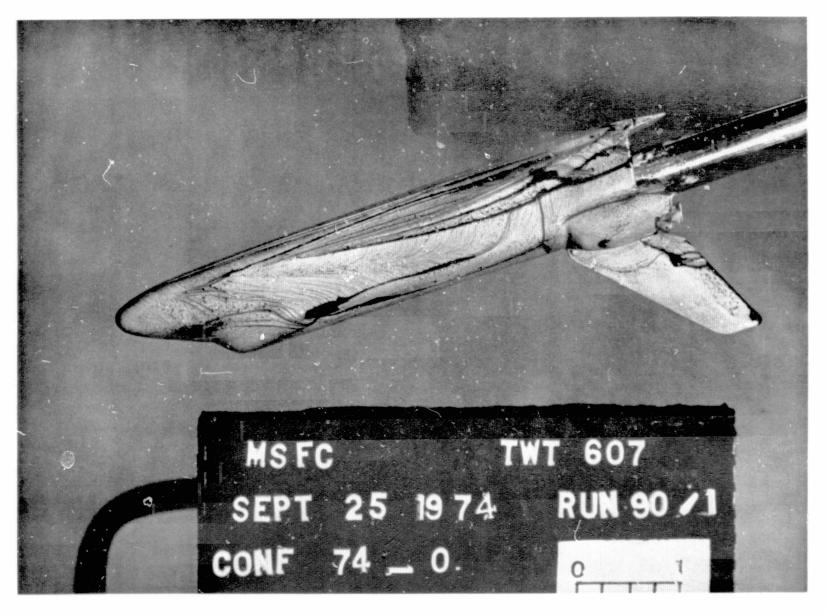
b. Left side view

Figure 24. - Continued.



c. Top view

Figure 24. - Concluded.

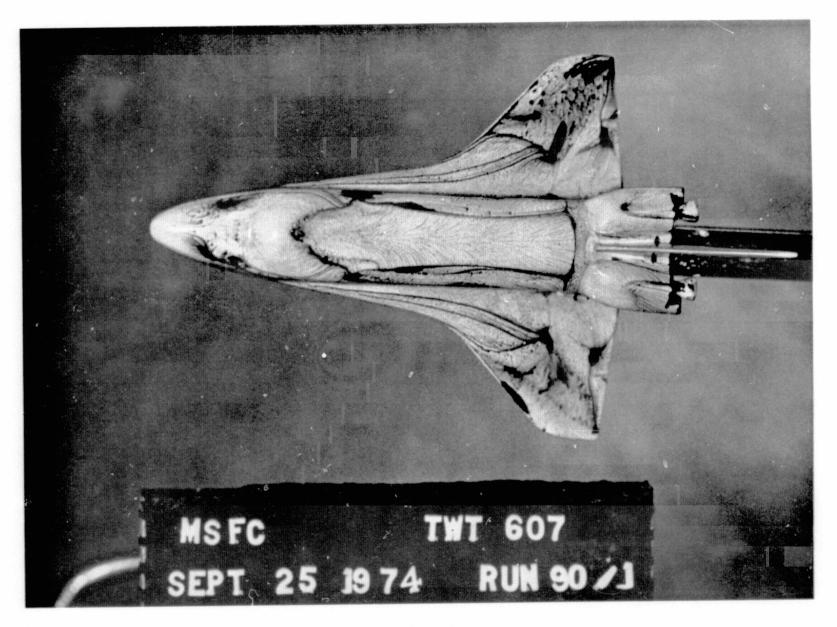


a. Right side view

Figure 25. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 25° MACH = 1.25

b. Left side view

Figure 25. - Continued.



c. Top view

Figure 25. - Concluded.

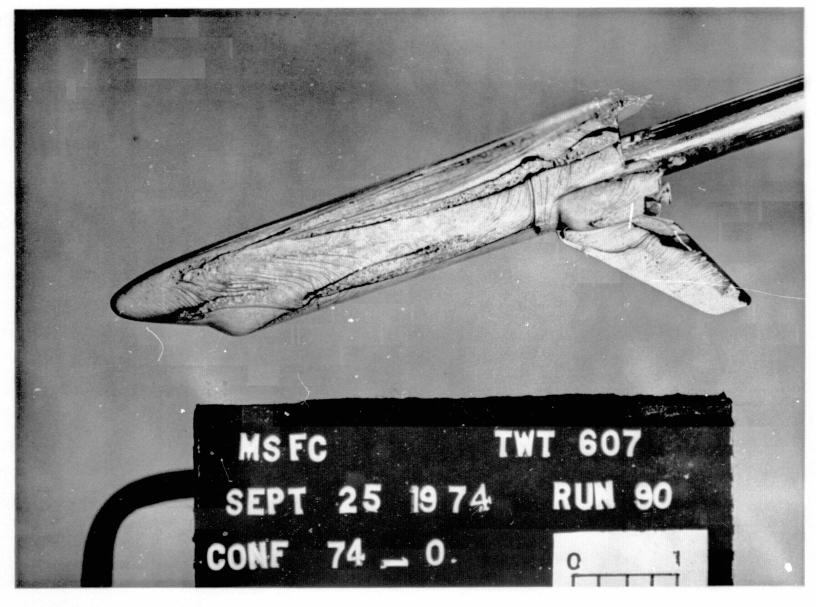
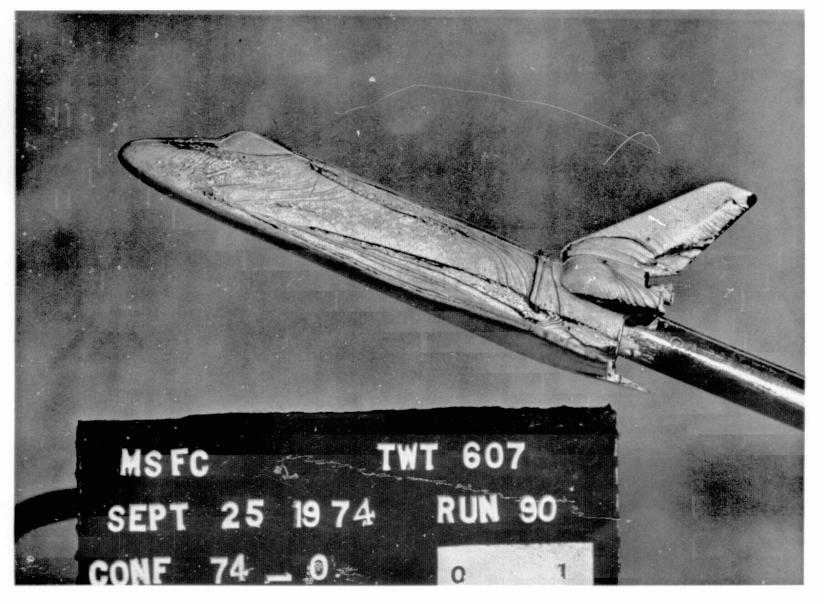
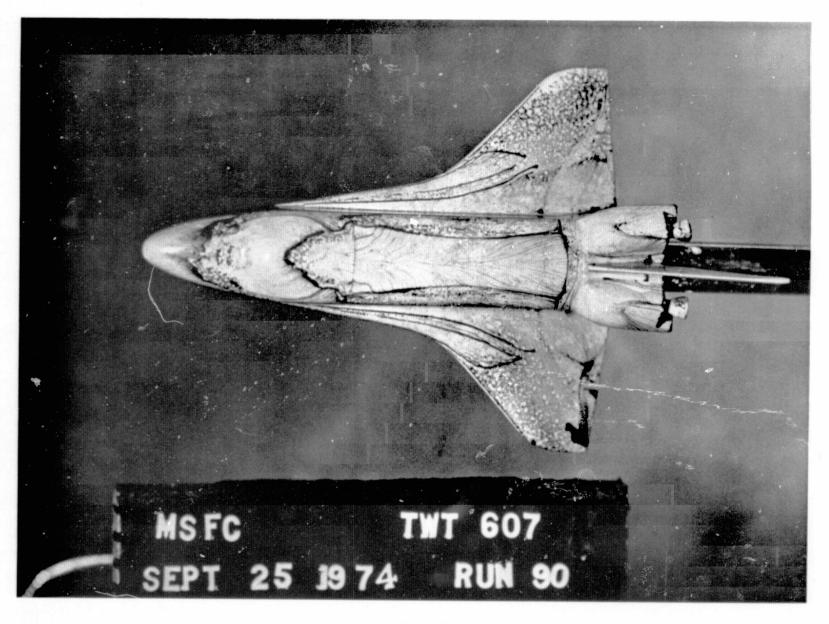


Figure 26. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 25° MACH = 1.25



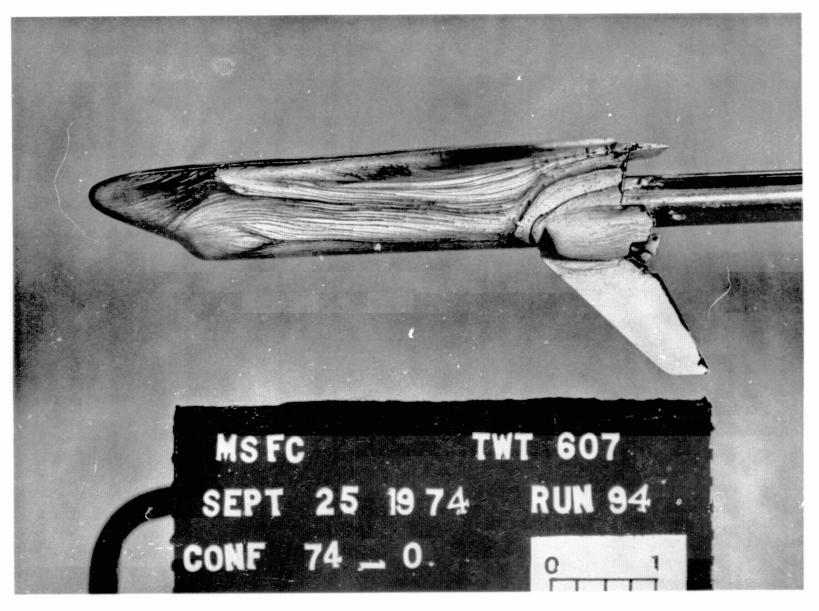
b. Left side view

Figure 26. - Continued.



c. Top view

Figure 26. - Concluded.



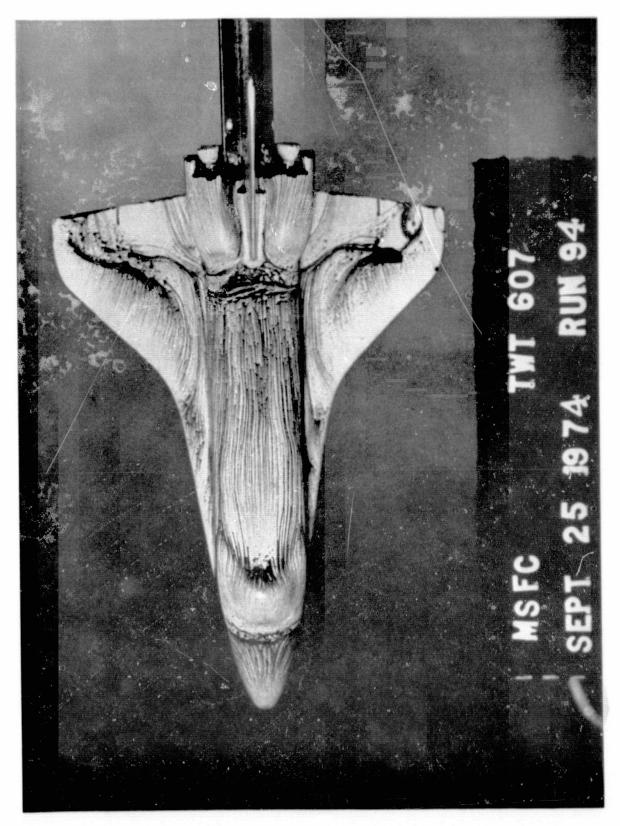
a. Right side view

Figure 27. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 0° MACH = 1.46



b. Left side view

Figure 27. - Continued.



c. Top view

Figure 27 . - Concluded.

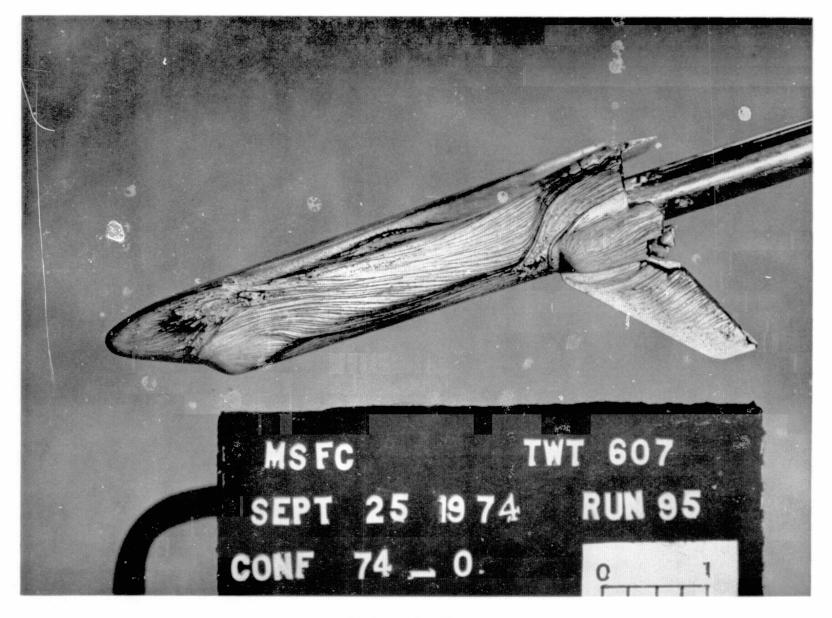
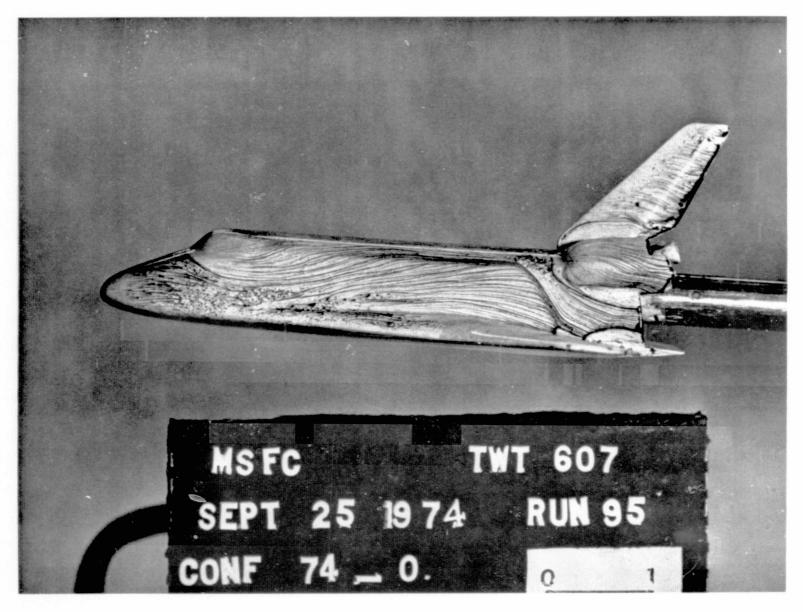


Figure 28. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 5° MACH = 1.46



b. Left side view

Figure 28 . - Continued.

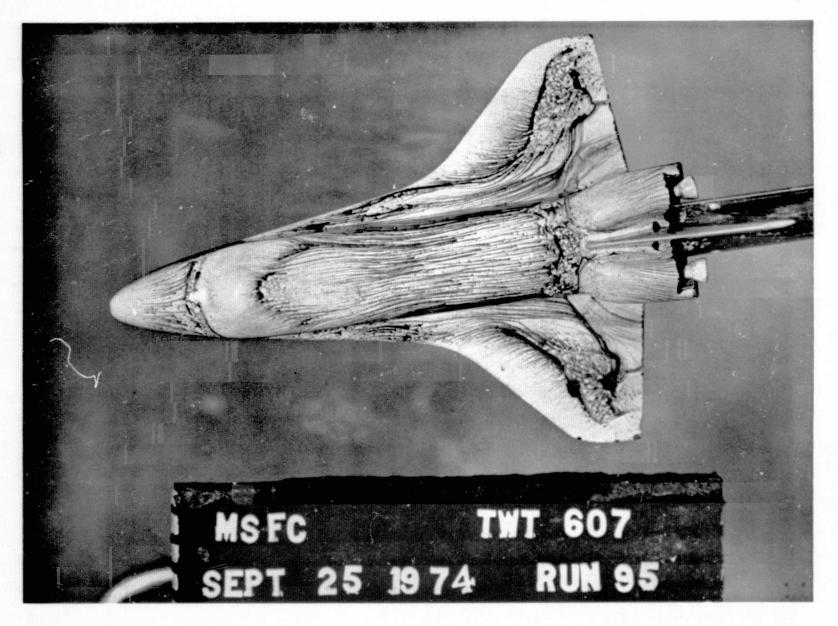
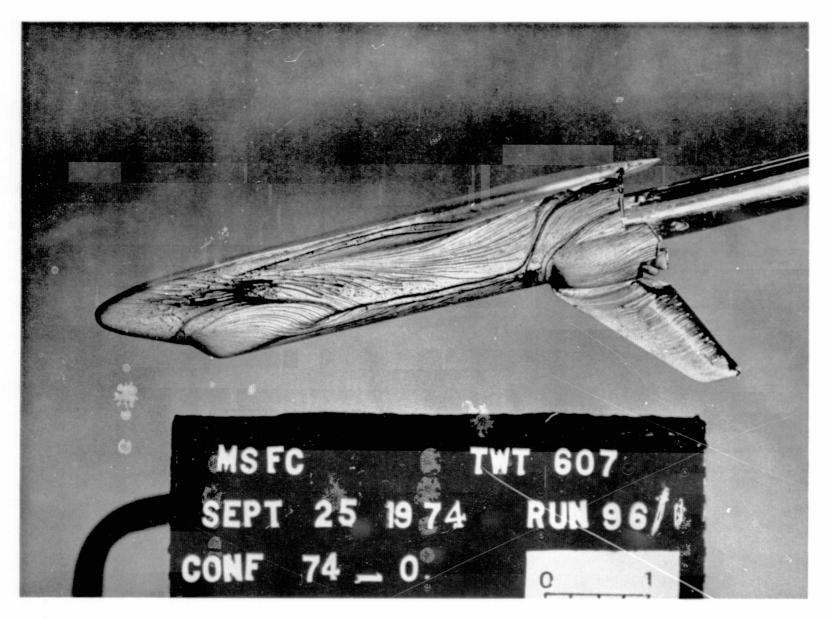


Figure 28. - Concluded.



a. Right side view

Figure 29. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 10^{99} MACH = 1.46



b. Left side view

Figure 29. - Continued.

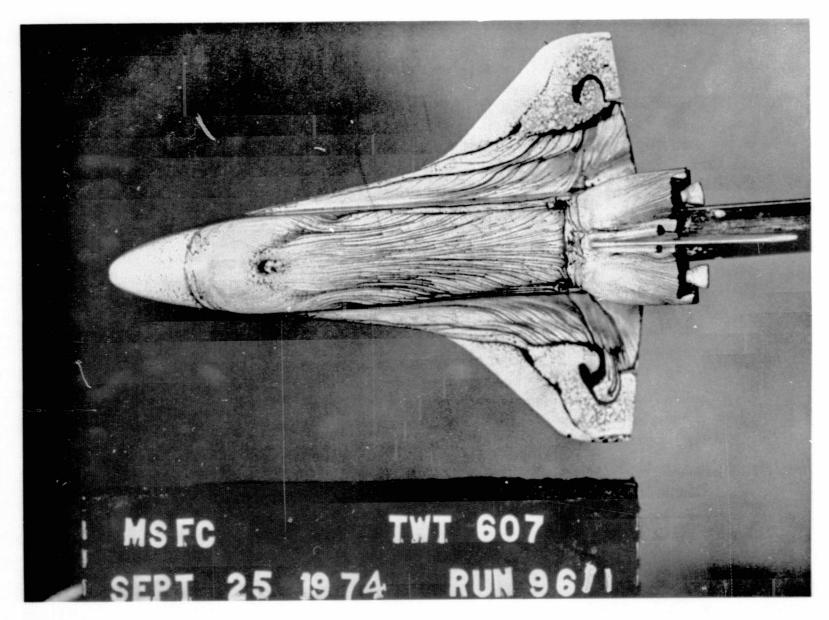


Figure 29. - Concluded.

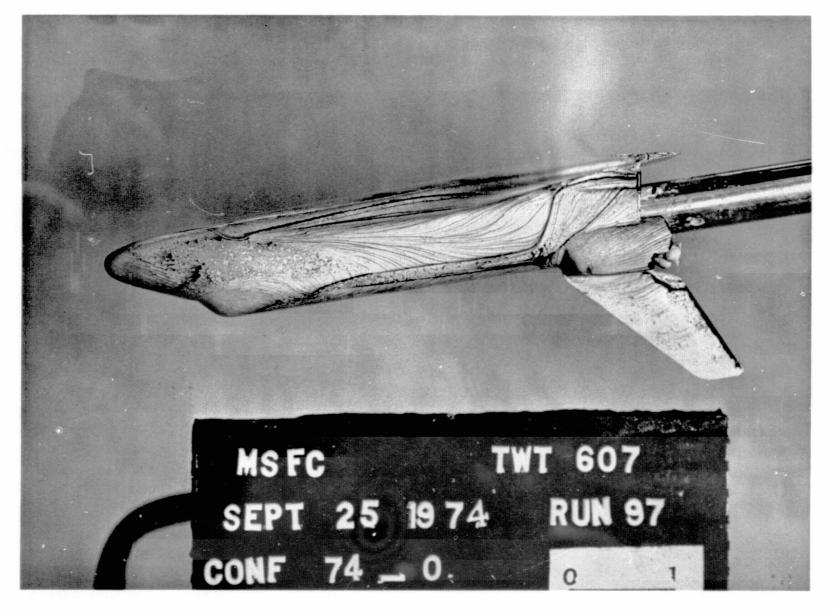
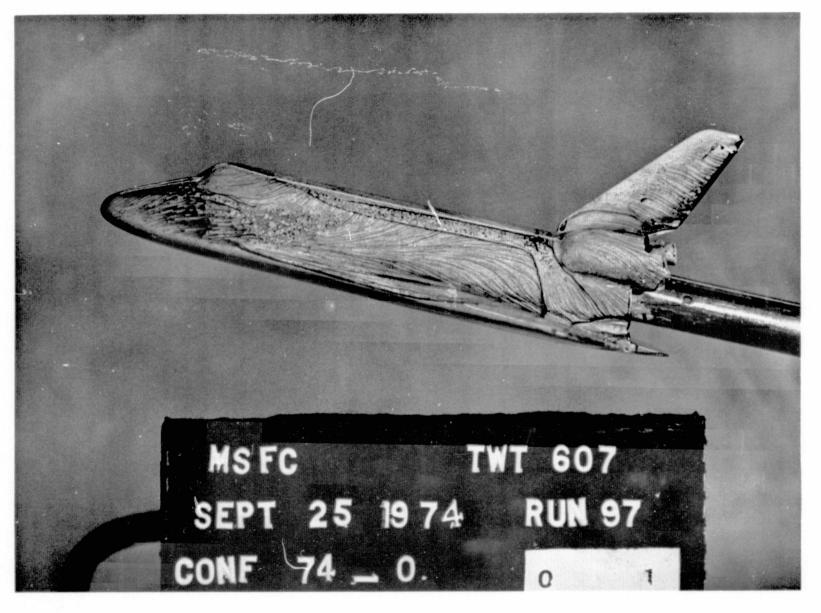


Figure 30. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 15° MACH = 1.46



b. Left side viewFigure 30. - Continued.

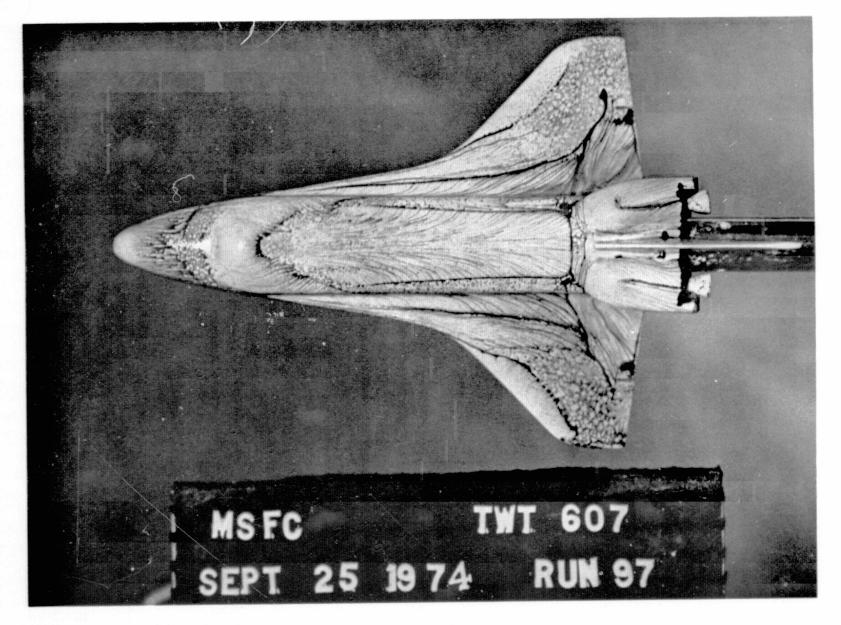


Figure 30. - Concluded.

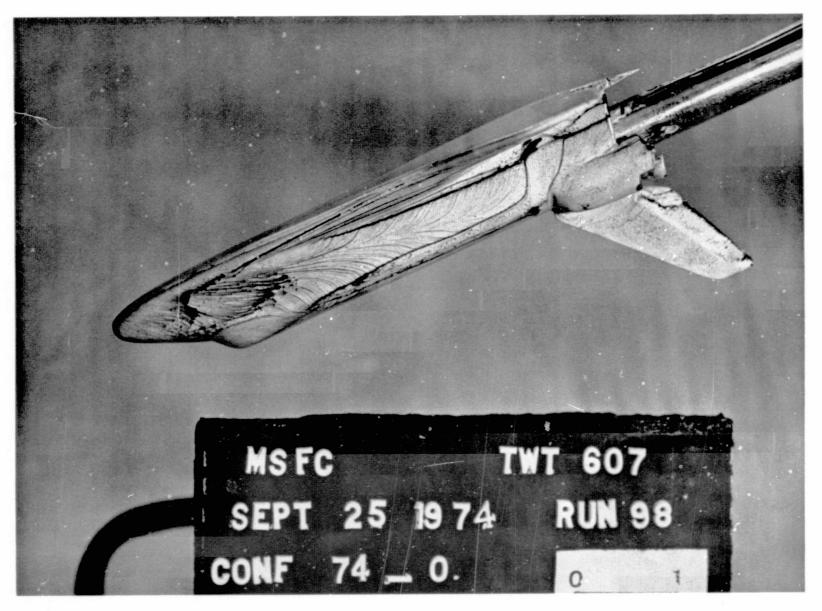
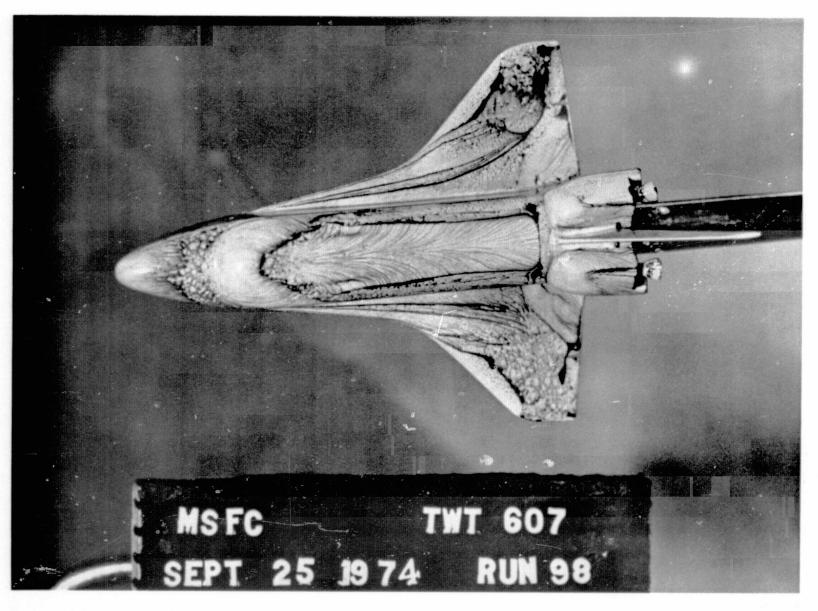


Figure 31. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 $ALPHA = 20^{\circ}$ MACH = 1.46



Figure 31. - Continued.



c. Top view

Figure 31. - Concluded.

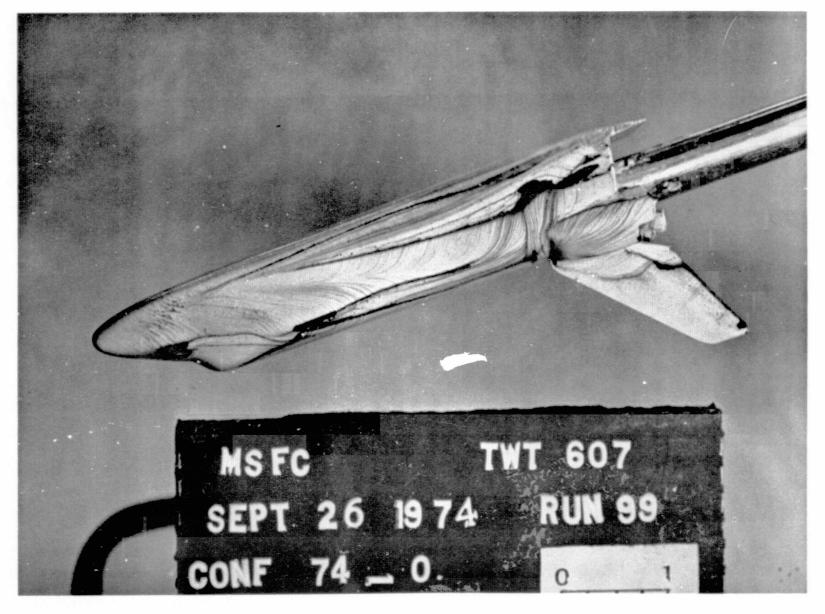
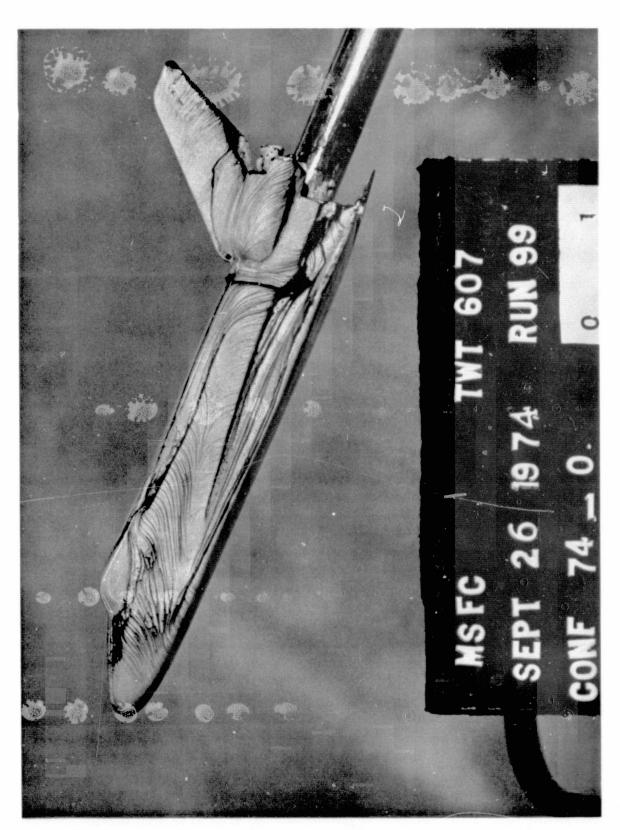


Figure 32. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 25^{\bullet} MACH = 1.46



b. Left side view

Figure 32. - Continued.

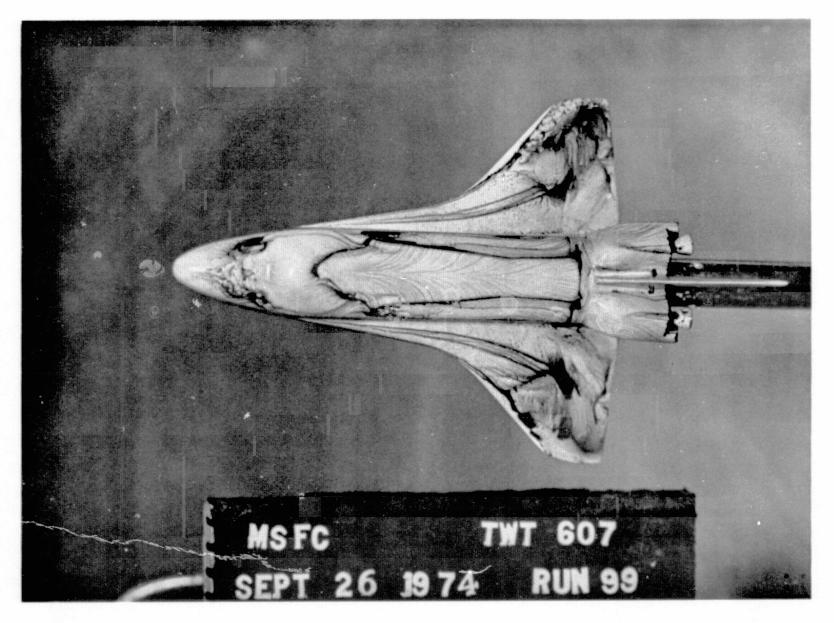
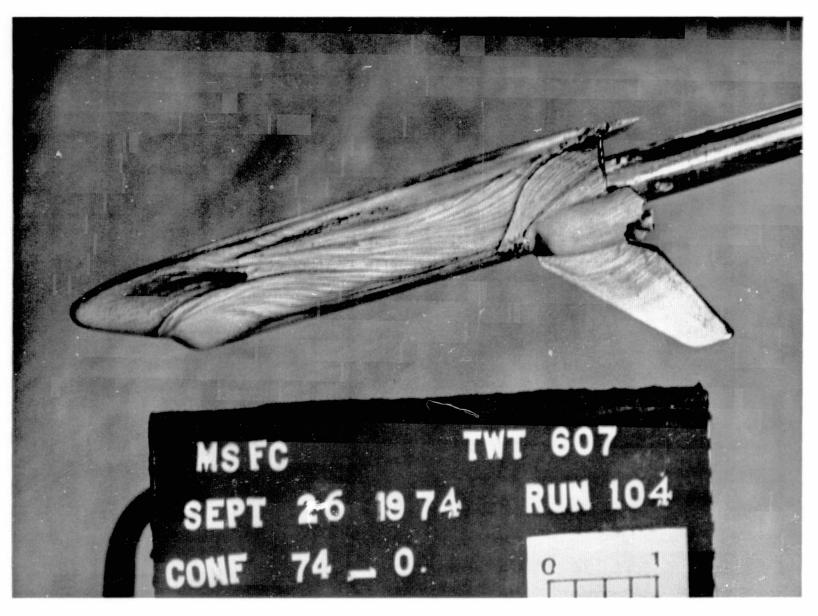
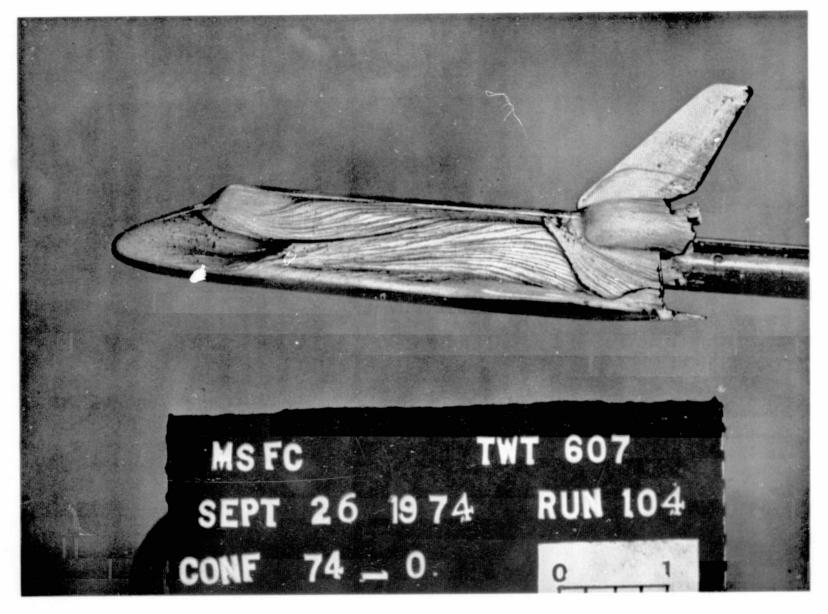


Figure 32. - Concluded.



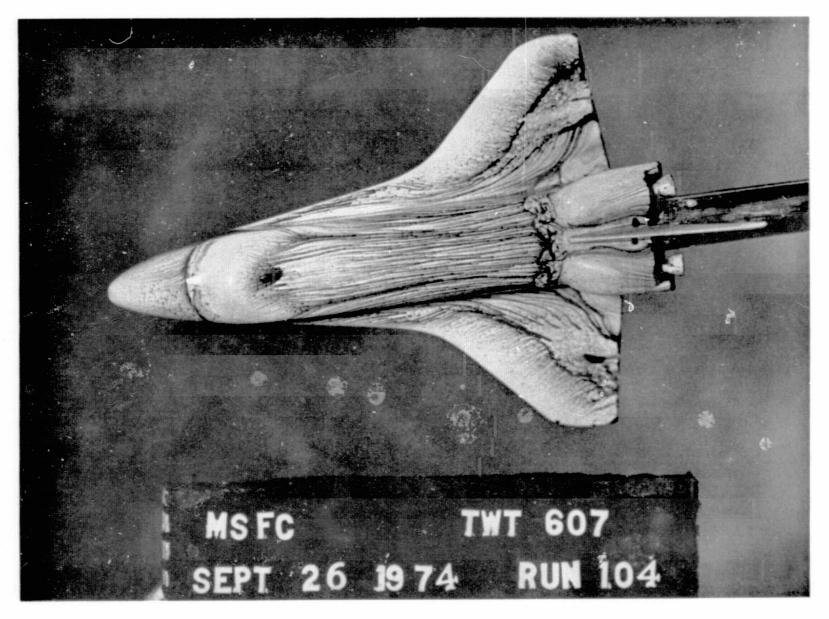
a. Right side view

Figure 33. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 5° MACH = 1.96



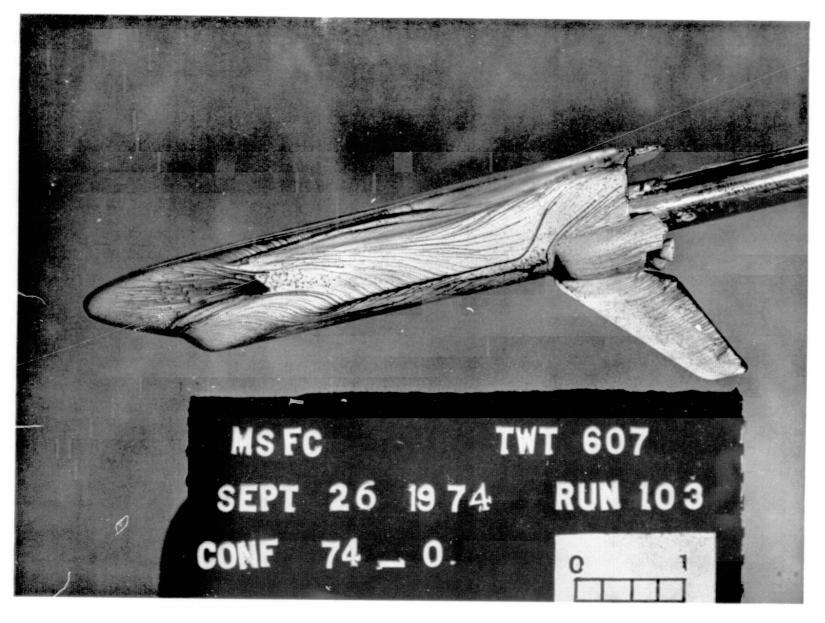
b. Left side view

Figure 33. - Continued.



c. Top view

Figure 33. - Concluded.



a. Right side view

Figure 34. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 10° MACH = 1.96



b. Left side view

Figure 34. - Continued.

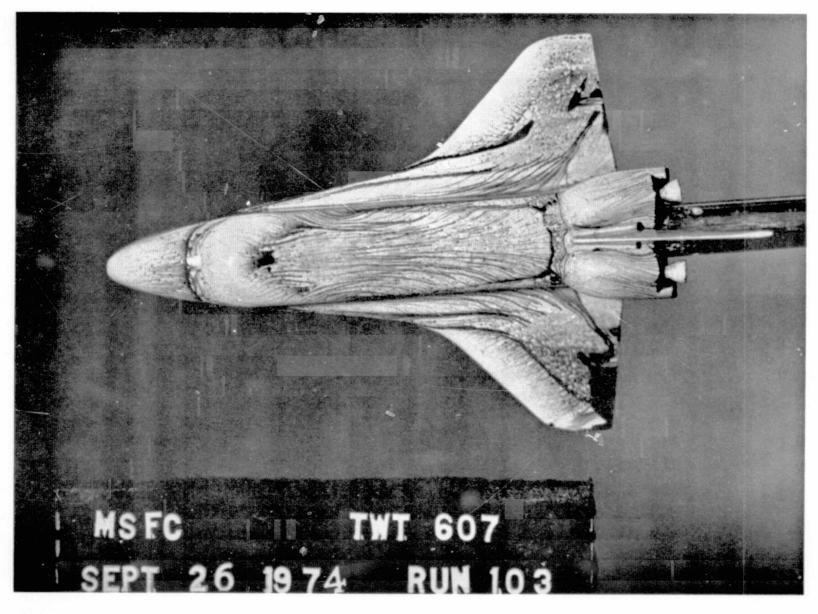
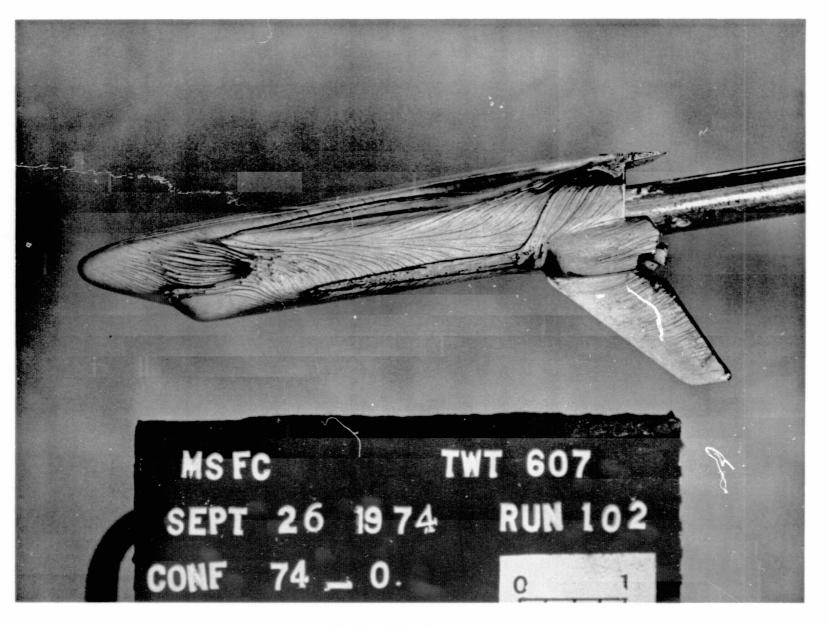
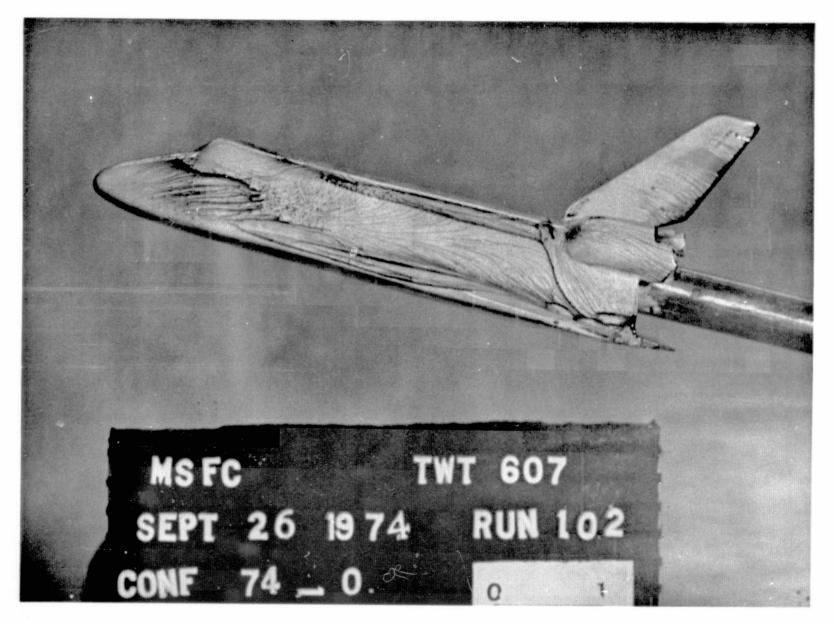


Figure 34. - Concluded.



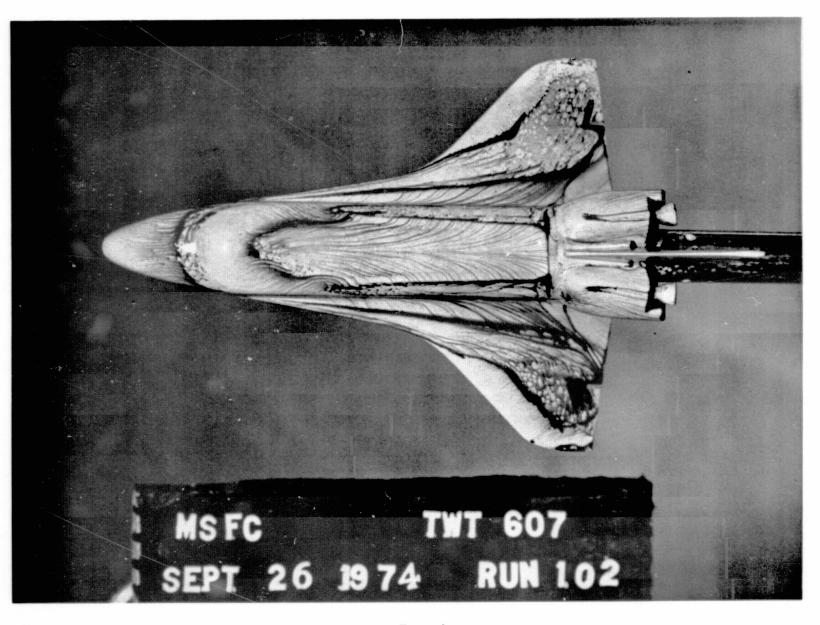
a. Right side view

Figure 35. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 15° MACH = 1.96

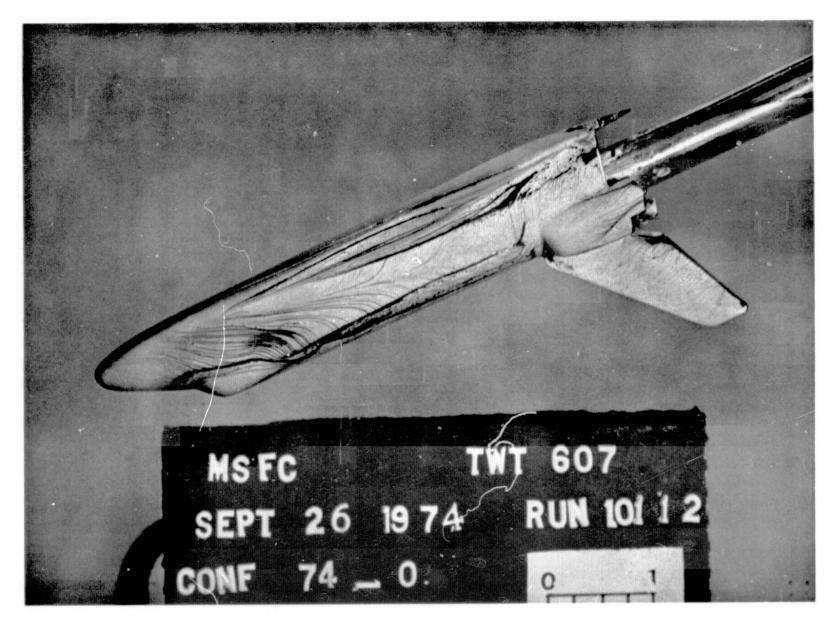


b. Left side view

Figure 35. - Continued.

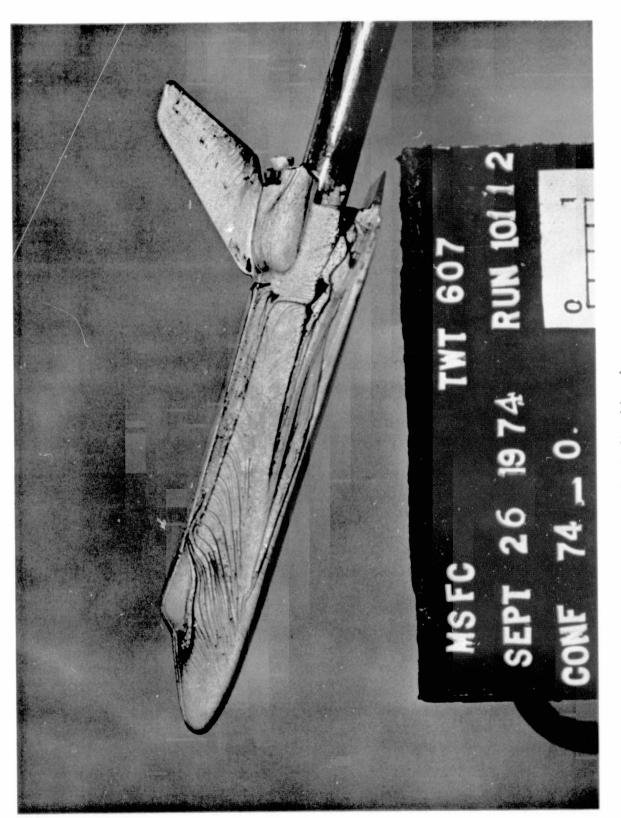


c. Top viewFigure 35. - Concluded.



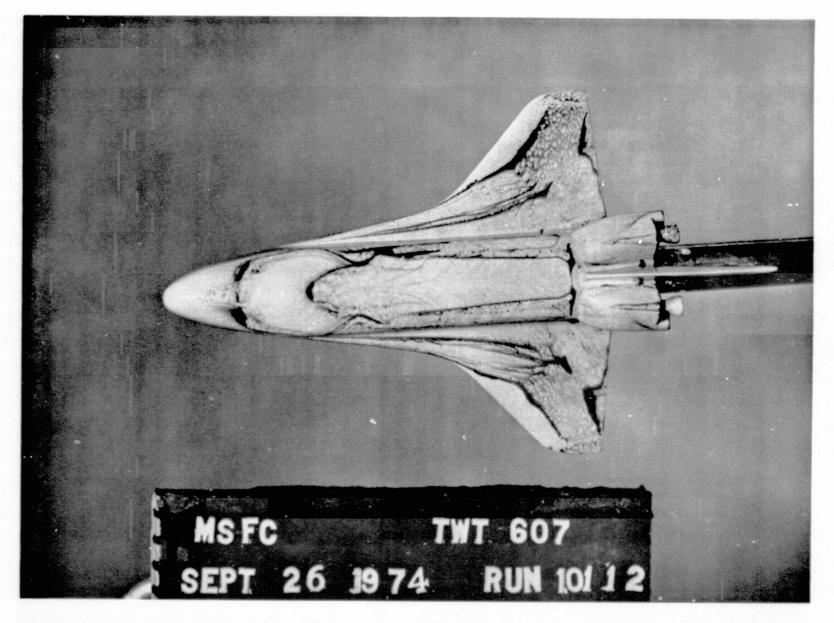
a. Right side view

Figure 36. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 20° MACH = 1.96



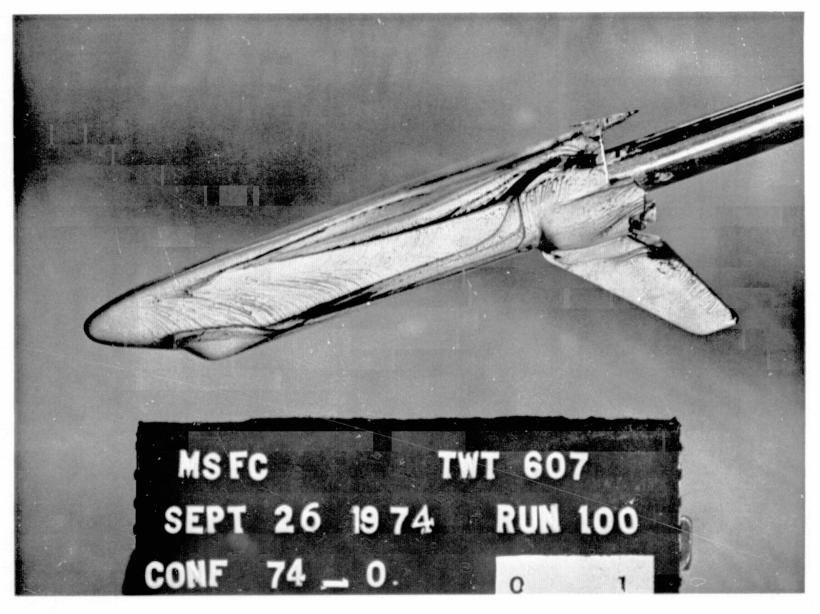
b. Left side view

Figure 36. - Continued.



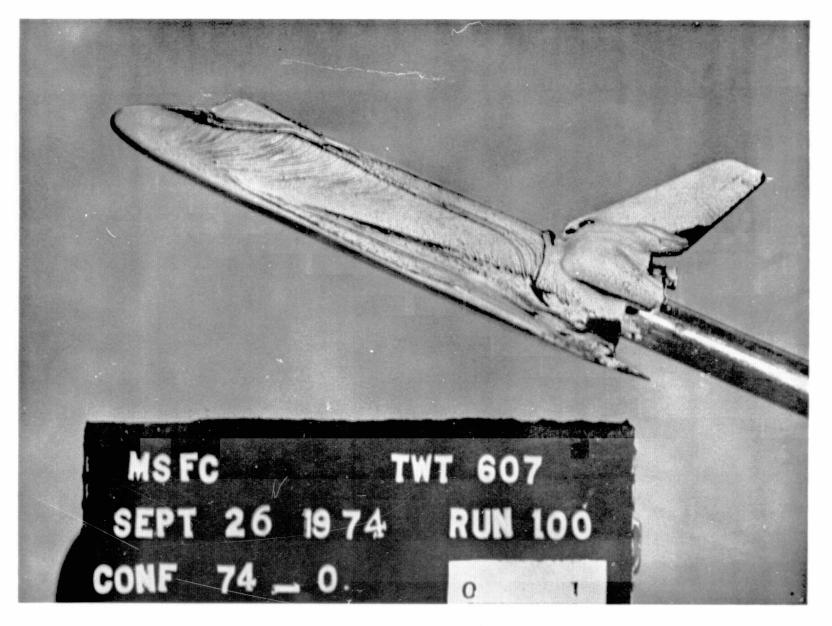
c. Top view

Figure 36. - Concluded.



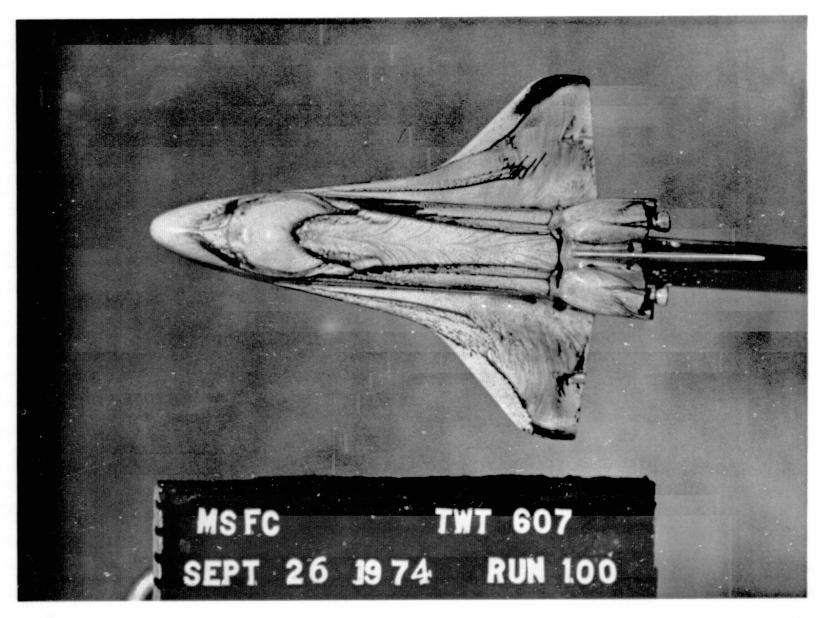
a. Right side view

Figure 37. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 25° MACH = 1.96



b. Left side view

Figure 37. - Continued.



c. Top view

Figure 37. - Concluded.

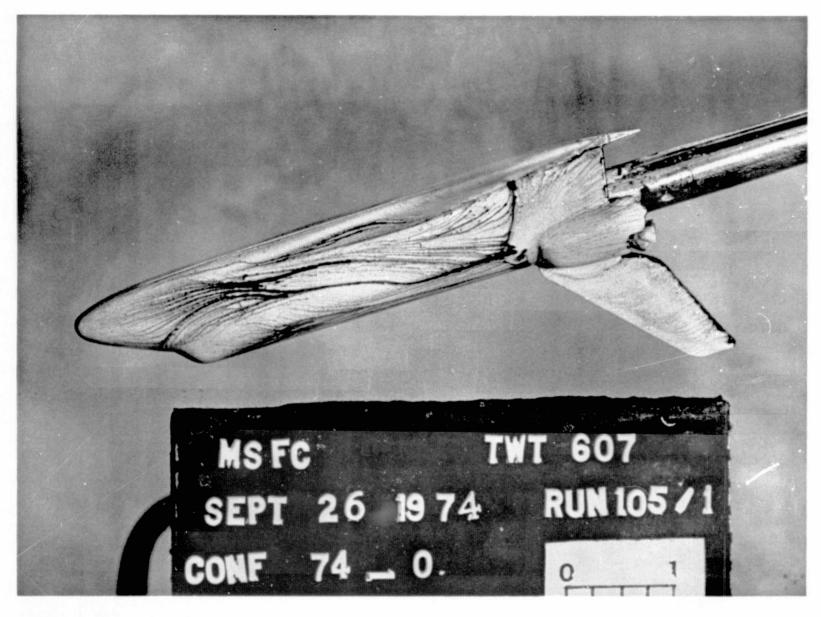
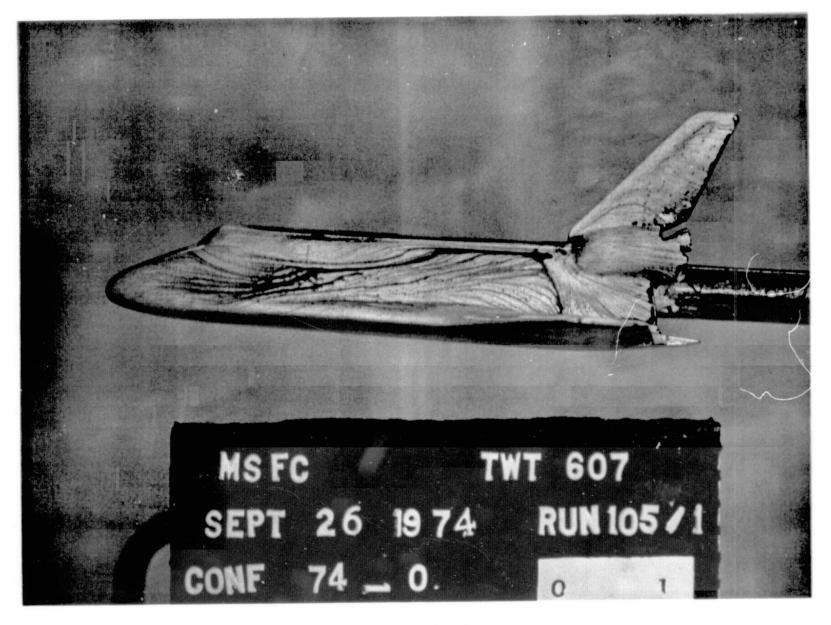


Figure 38. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 $ALPHA = 5^{\circ}$ MACH = 2.75



b. Left side viewFigure 38. - Continued.

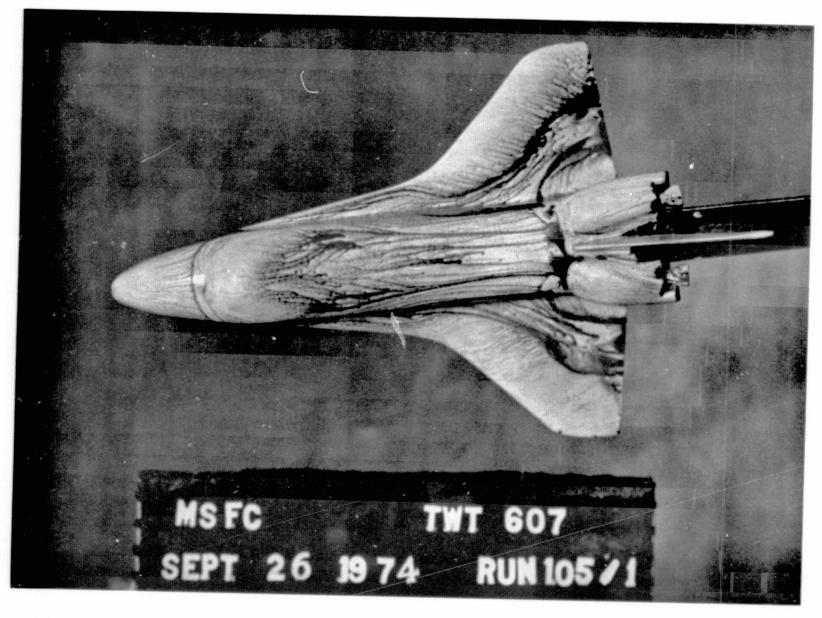


Figure 38. - Concluded.



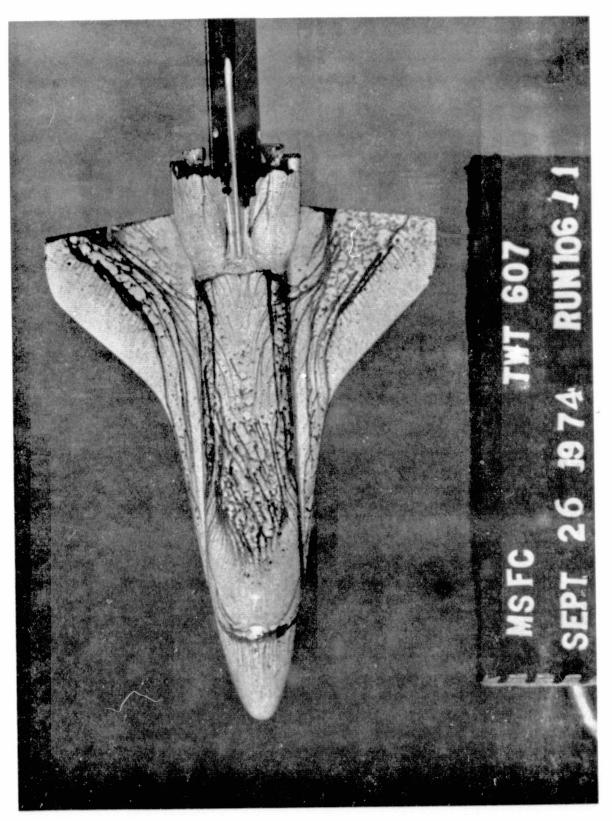
a. Right side view

Figure 39. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 10° MACH = 2.75



b. Left side view

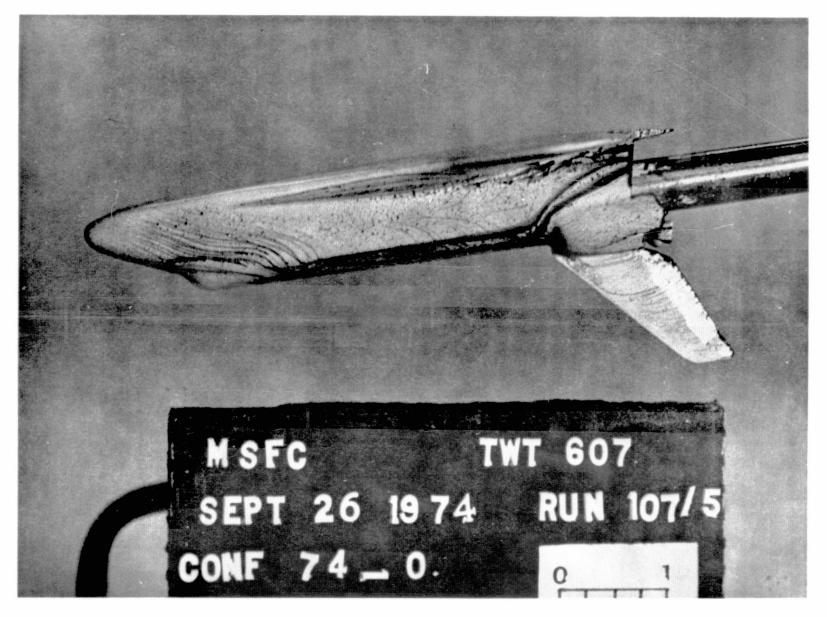
Figure 39. - Continued.



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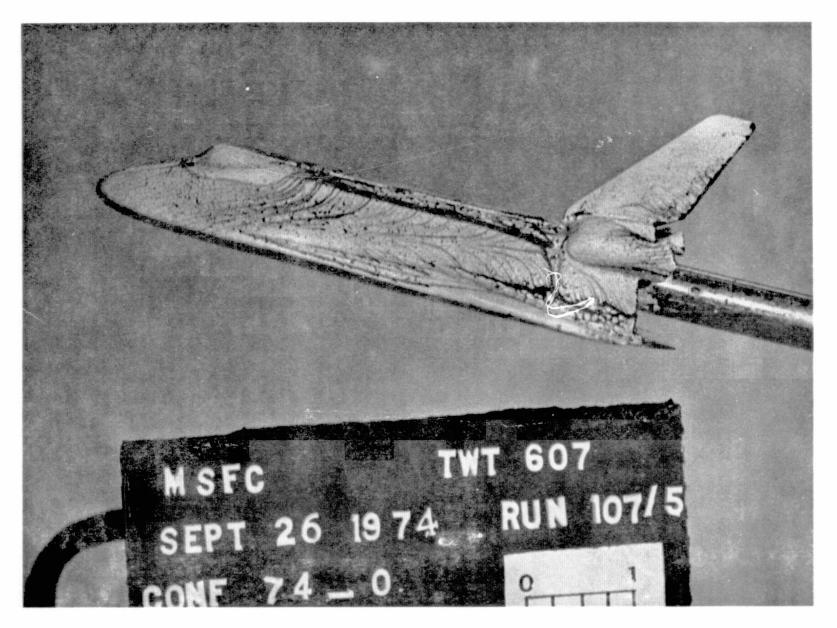
c. Top view

Figure 39. - Concluded.



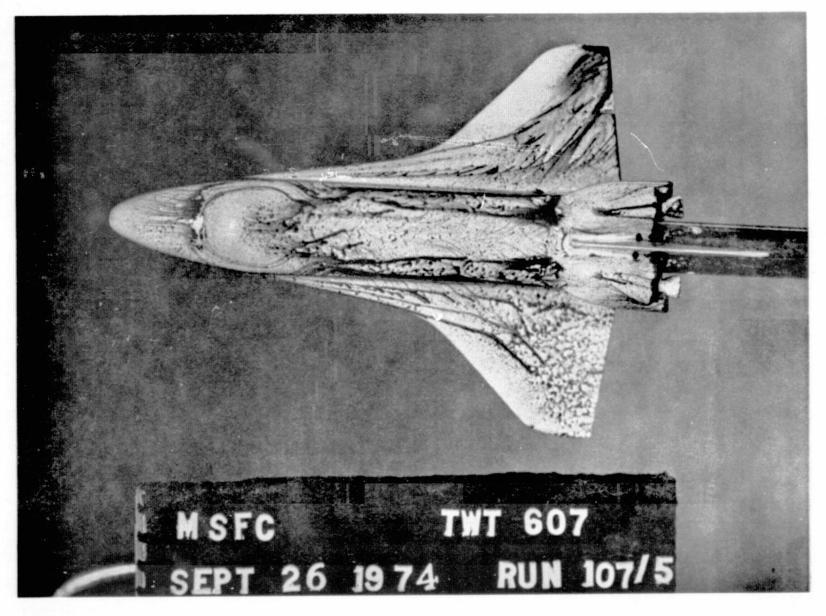
a. Right side view

Figure 40. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 15° MACH = 2.75



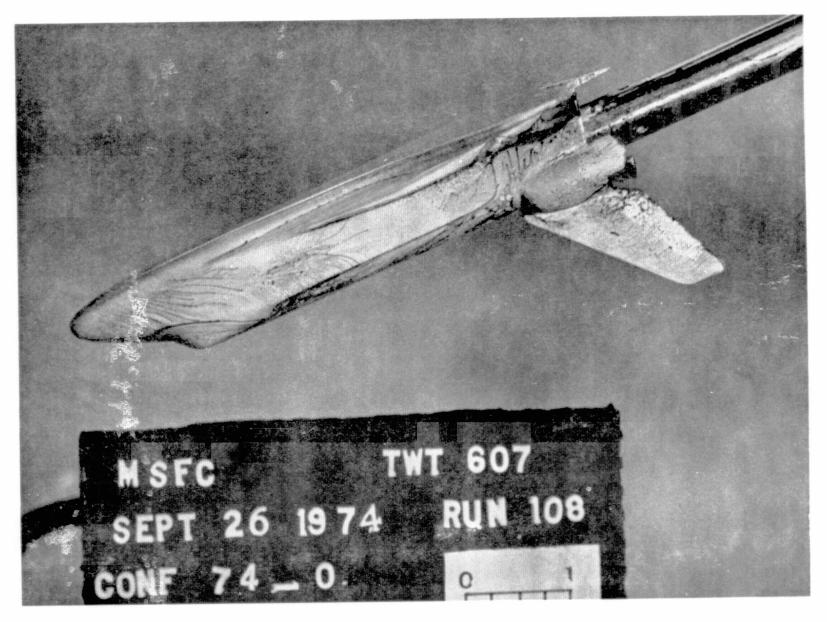
b. Left side view

Figure 40.- Continued.



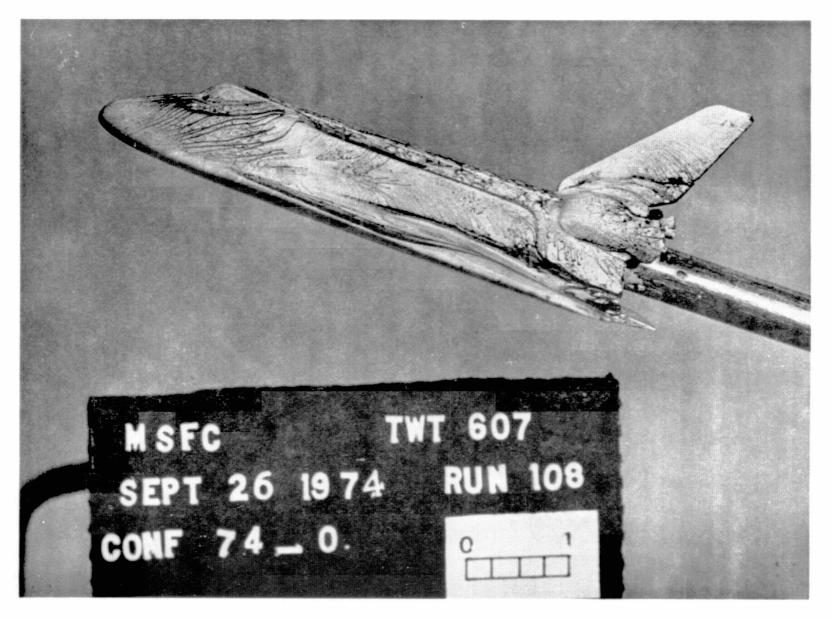
c. Top view

Figure 40. - Concluded.



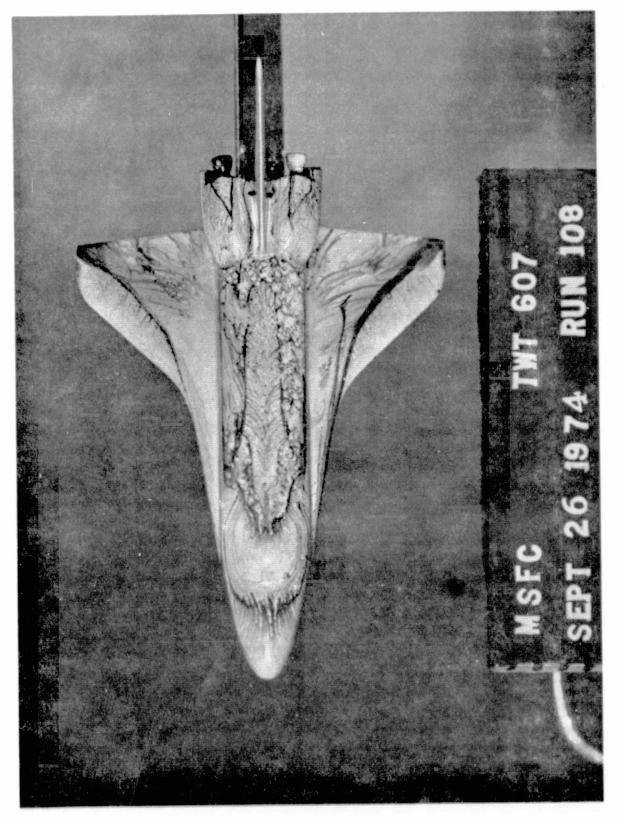
a. Right side view

Figure 41. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 20° MACH = 2.75



b. Left side view

Figure 41. - Continued.



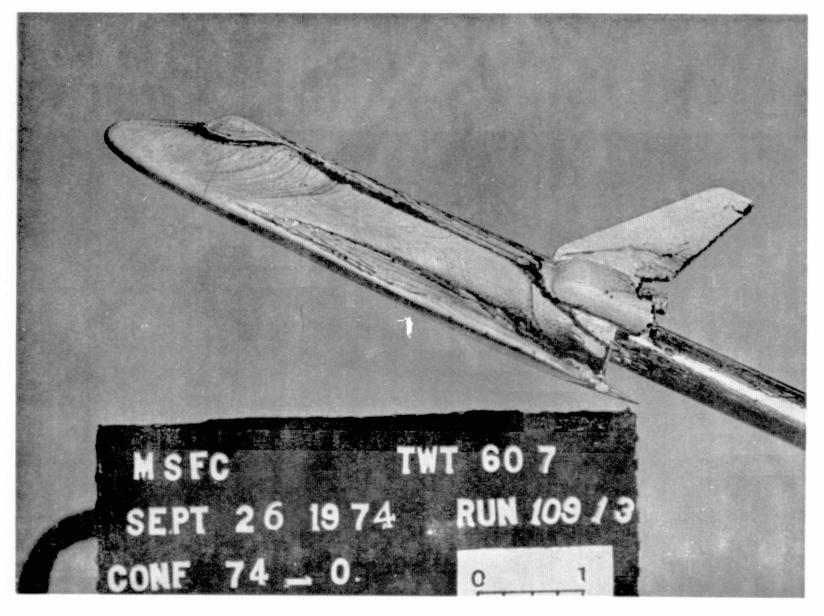
c. Top view

Figure 41. - Concluded.



a. Right side view

Figure 42. - ELV-L = -0.9 ELV-R = -0.7 RUDDER = 0 SPDBRK = 0 BDFLAP = 0.1 ALPHA = 25° MACH = 2.75



b. Left side view

Figure 42. - Continued.

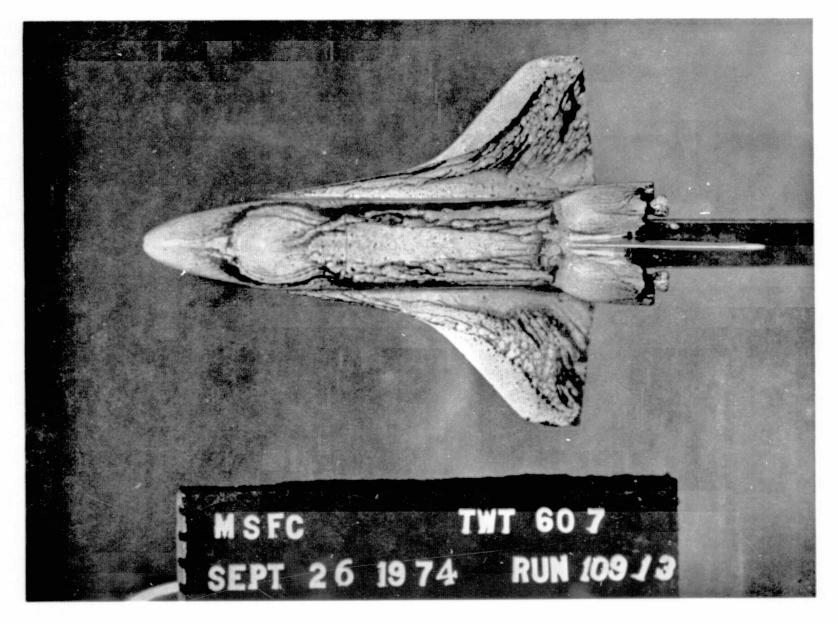
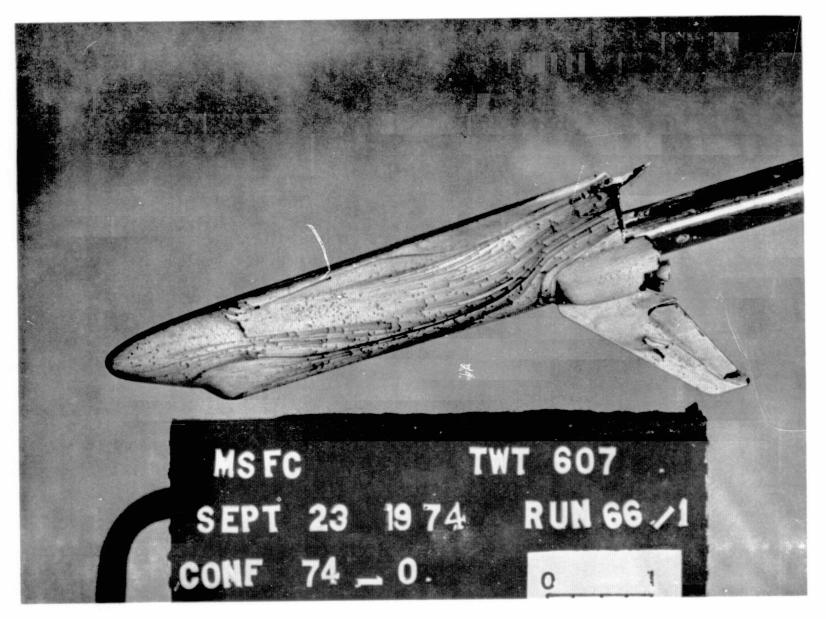


Figure 42. - Concluded.



a. Right side view

Figure 43. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 5° MACH = 0.6

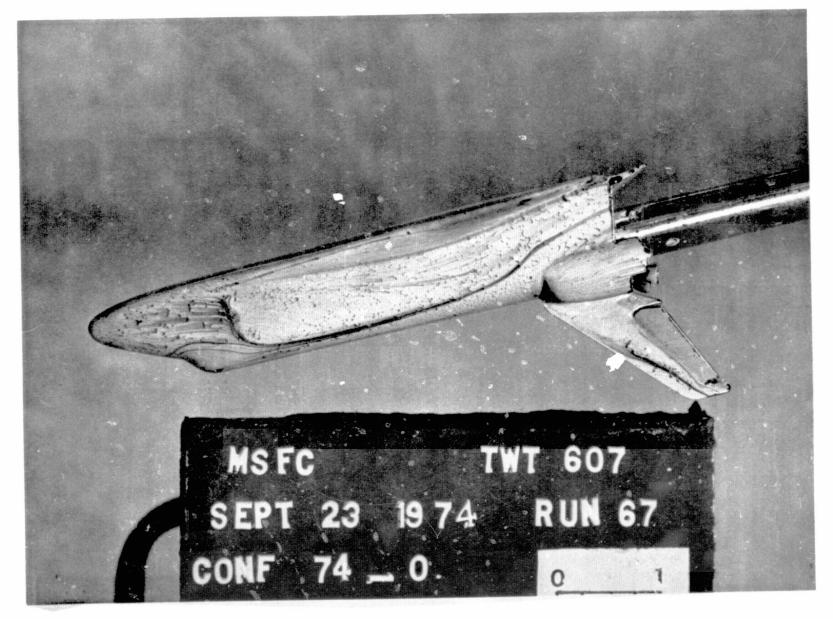


b. Left side view

Figure 43. - Continued.



Figure 43. - Concluded.



a. Klynt Side View

Figure 44. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 10° MACH = 0.6

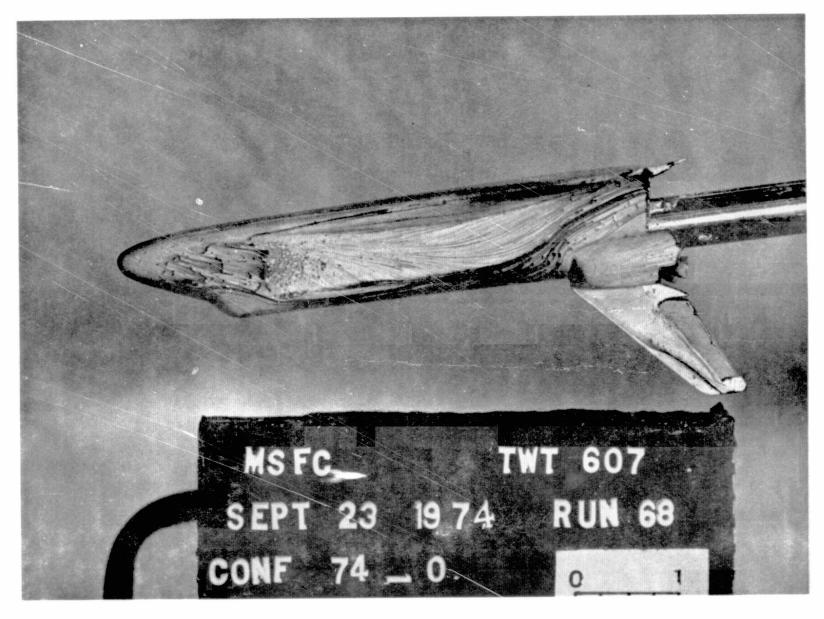


b. Left side view

Figure 44. - Continued.



Figure 44. - Concluded.



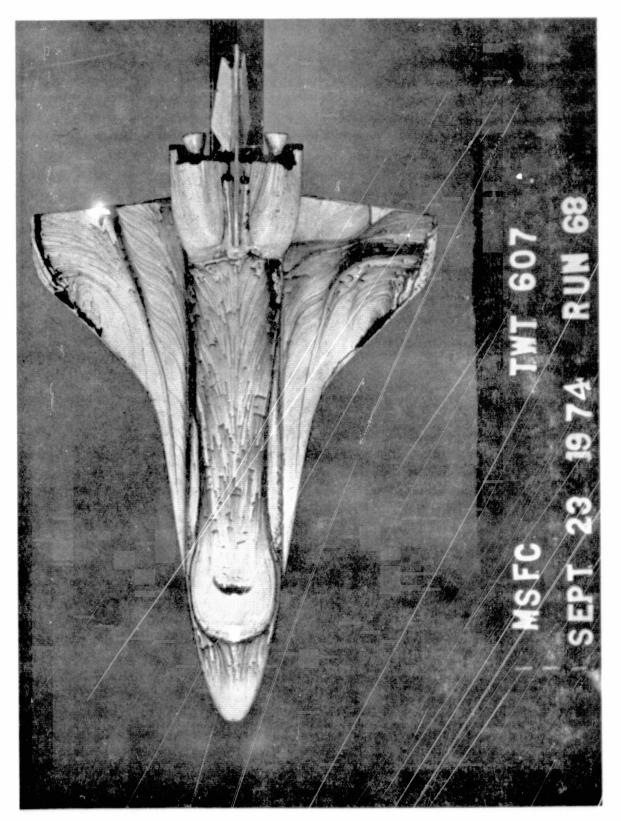
a. Right side view

Figure 45. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 15° MACH = 0.6



b. Left side view

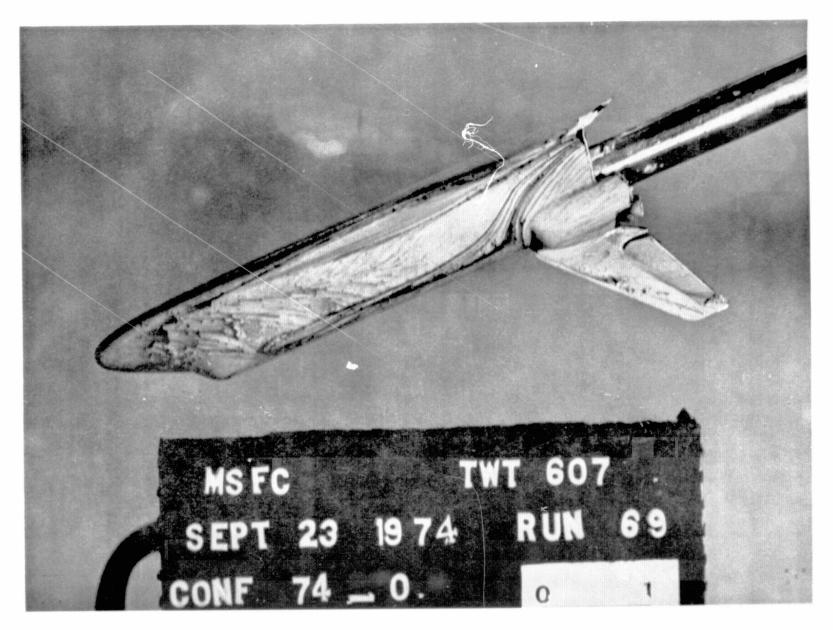
Figure 45. - Continued.



0

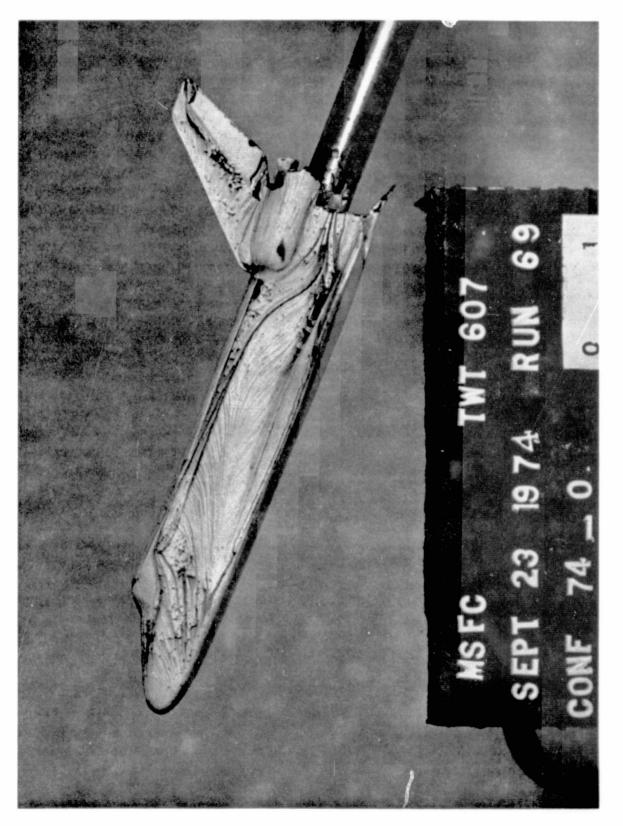
c. Top view

Figure 45. - Concluded.



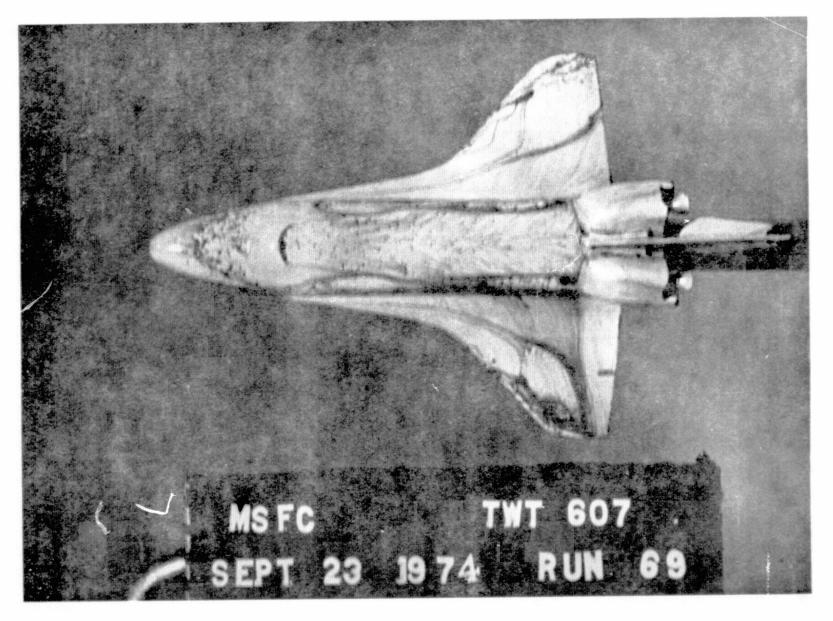
a. Right side view

Figure 46. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 20° MACH = 0.6



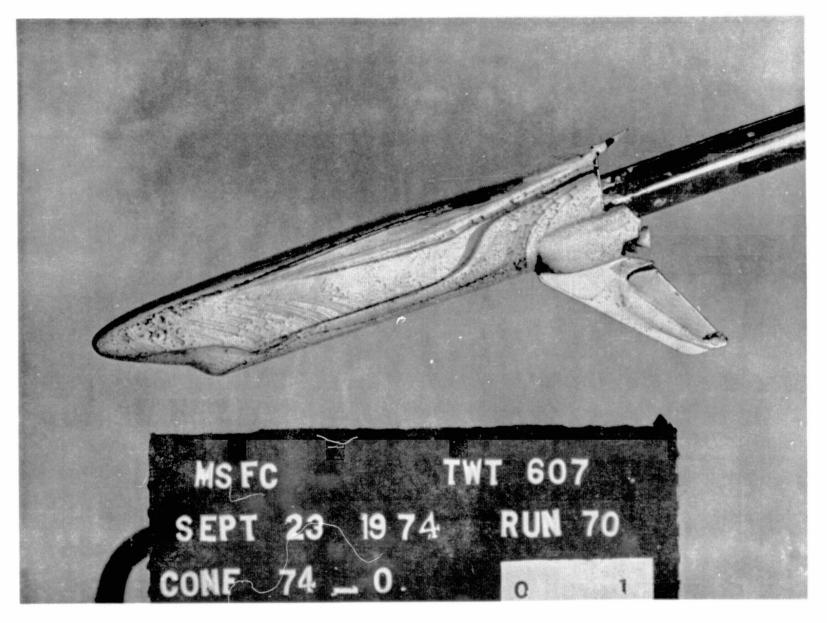
b. Left side view

Figure 46. - Continued.



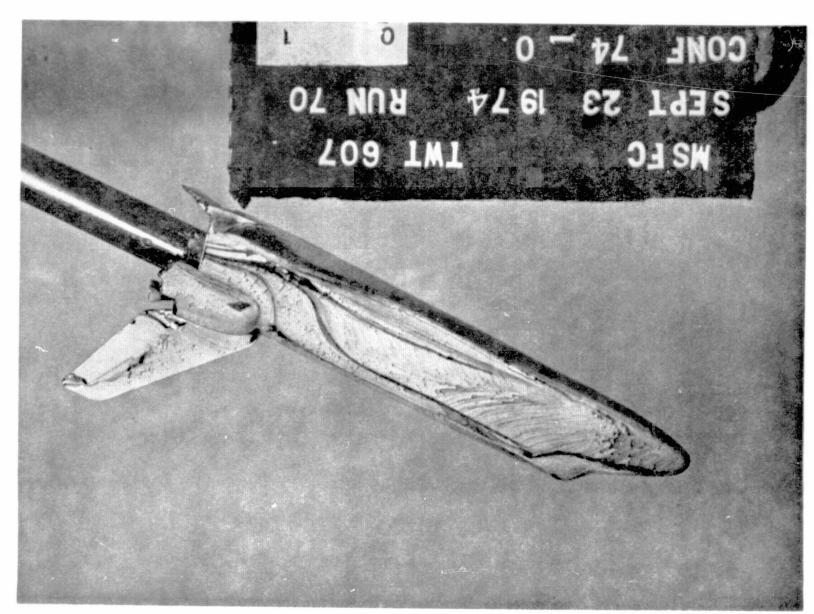
c. Top view

Figure 46. - Concluded.



a. Right side view

Figure 47. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 25° MACH = 0.6



b. Left side view

Figure 47. - Continued.

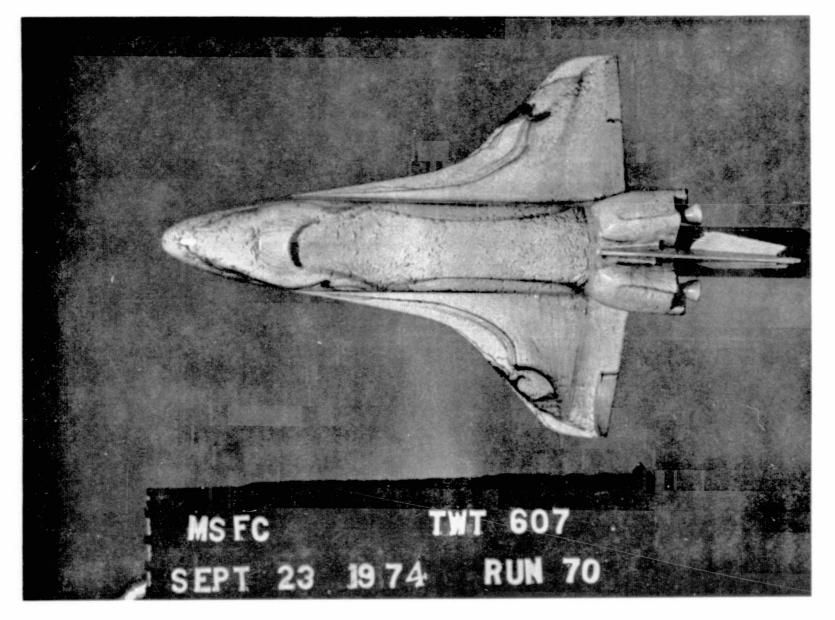
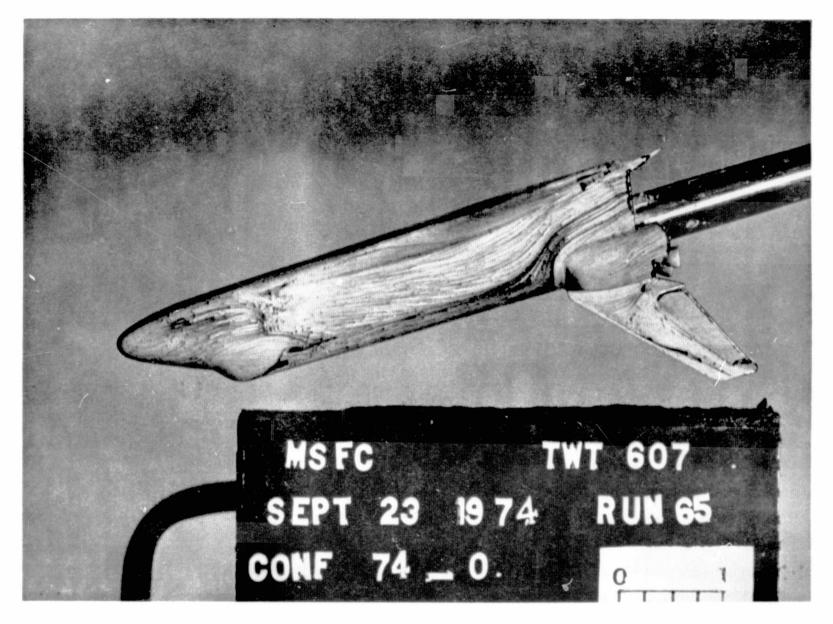
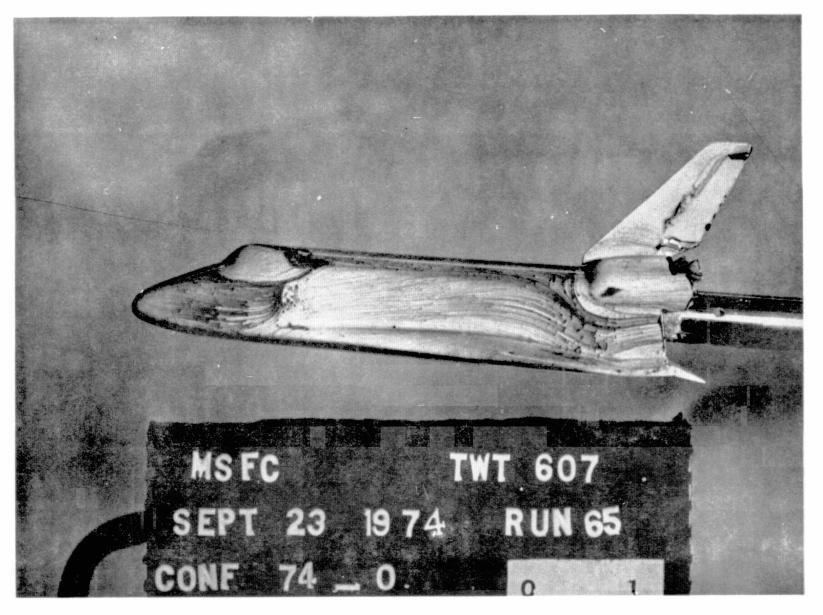


Figure 47. - Concluded.



a. Right side view

Figure 48. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 5° MACH = 0.9



b. Left side view

Figure 48. - Continued.

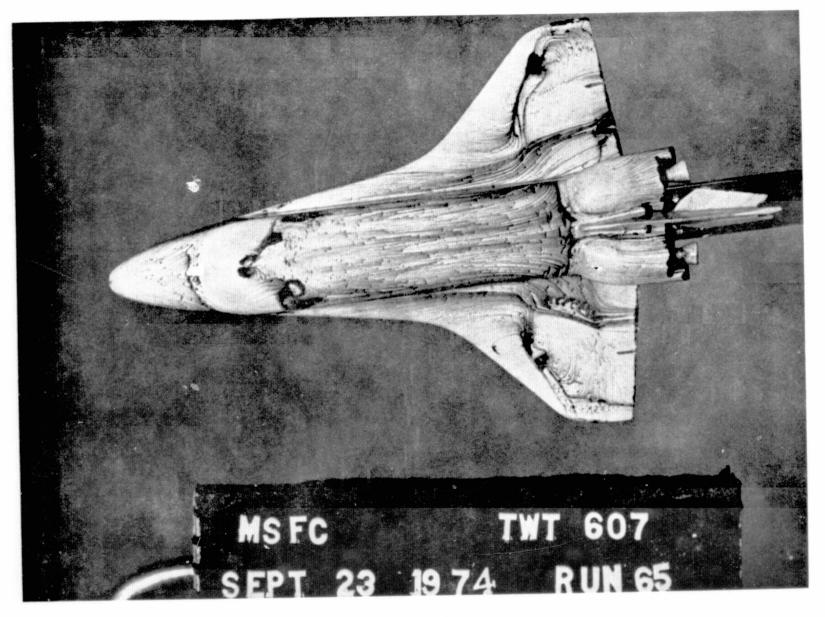
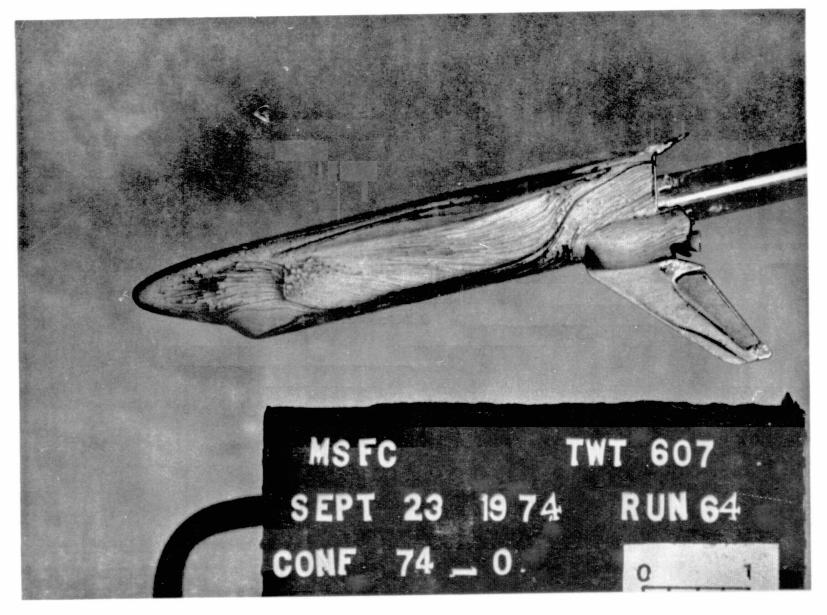
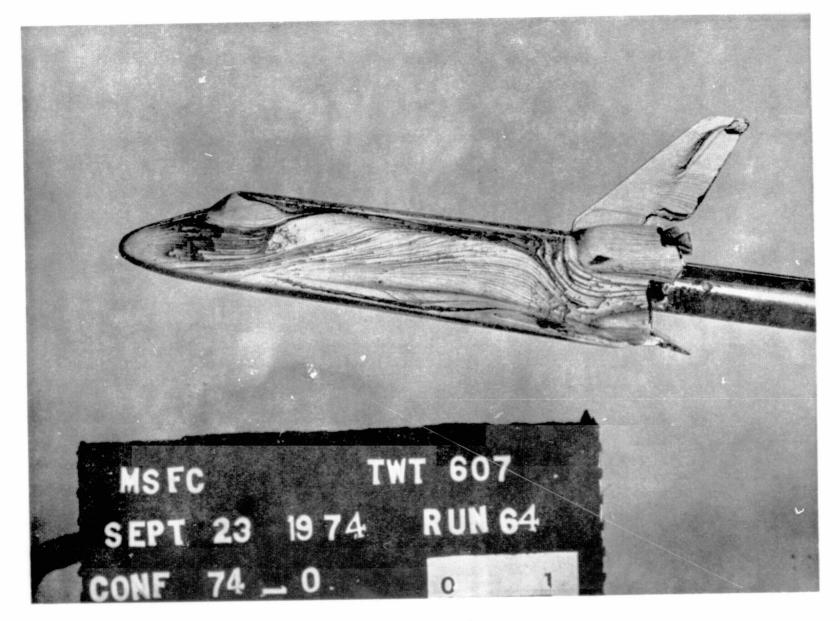


Figure 48. - Concluded.



a. Right side view

Figure 49. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAF = 16.2 ALPHA = 10° MACH = 0.9

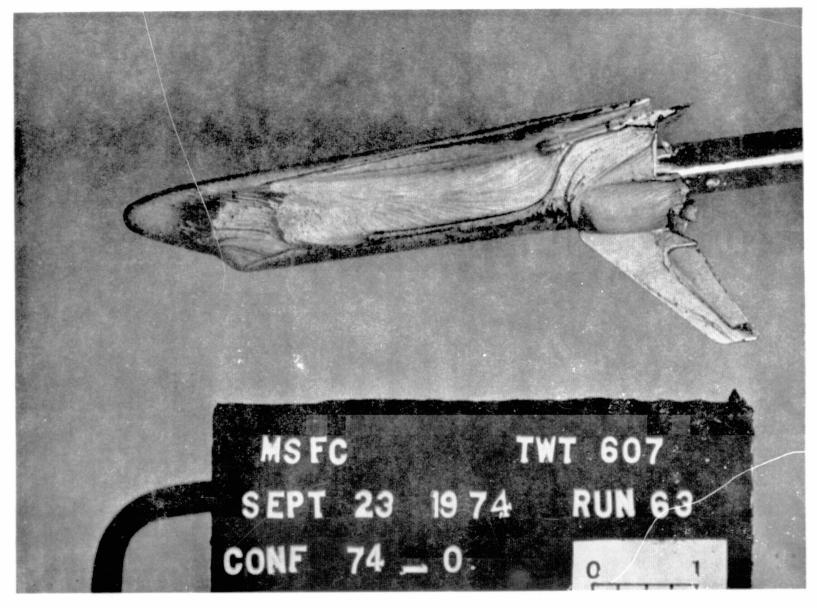


b. Left side view

Figure 49. - Continued.



Figure 49. - Concluded.



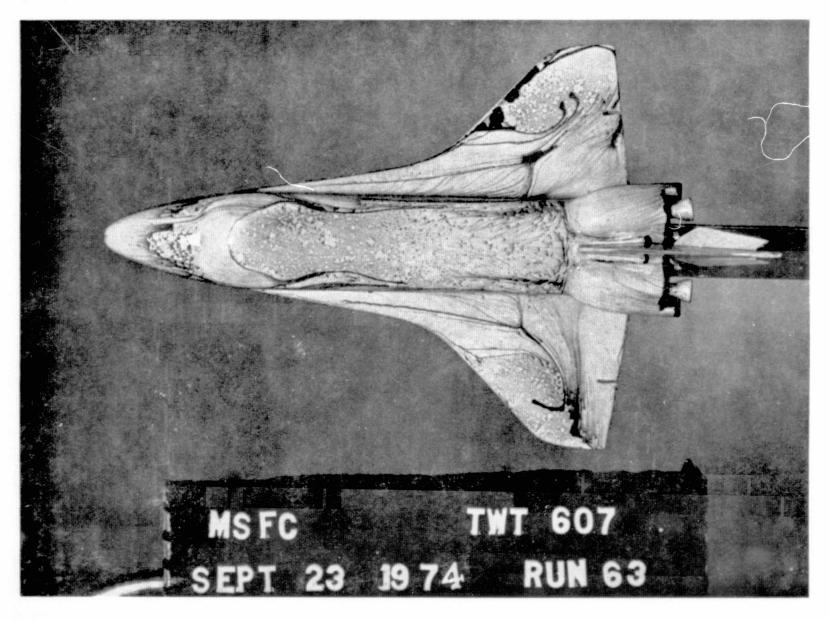
a. Right side view

Figure 50. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 15° MACH = 0.9



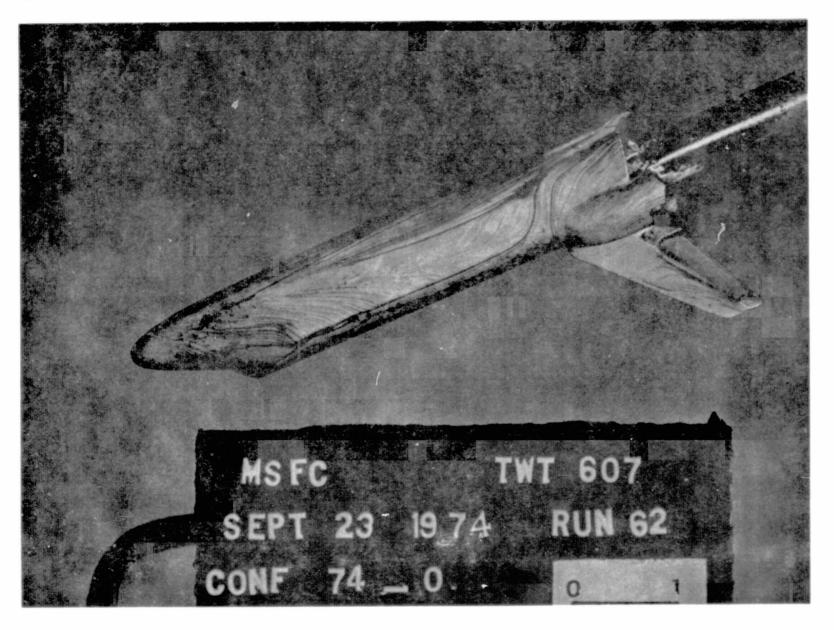
b. Left side view

Figure 50. - Continued.



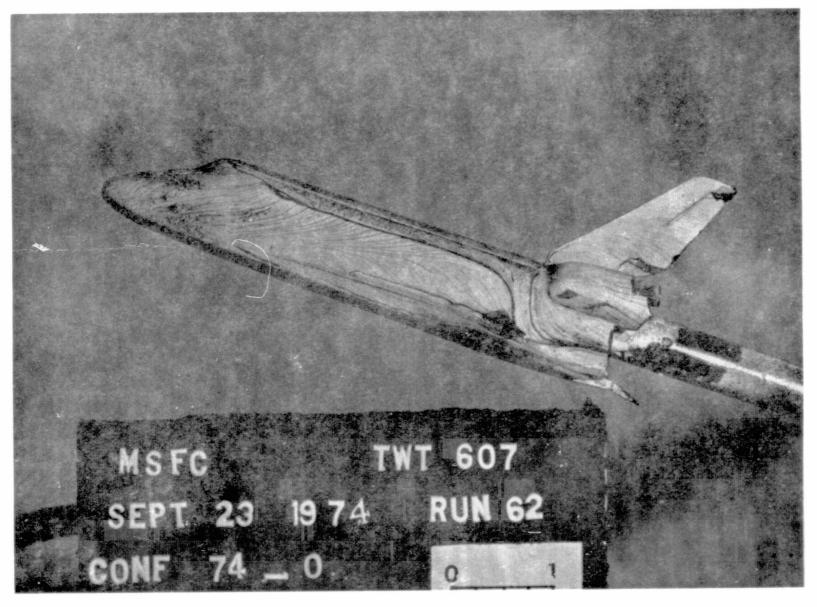
c. Top view

Figure 50. - Concluded.



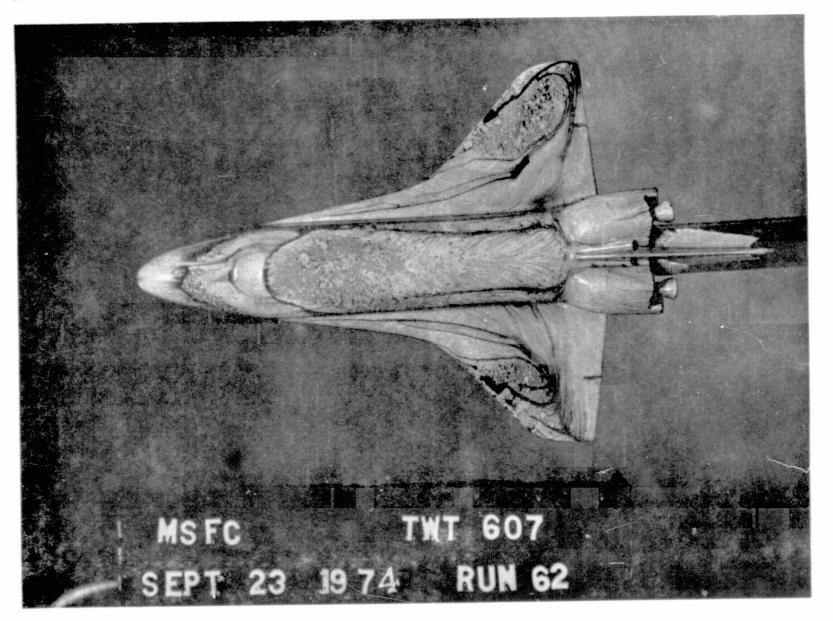
a. Right side view

Figure 51. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 20° MACH = 0.9



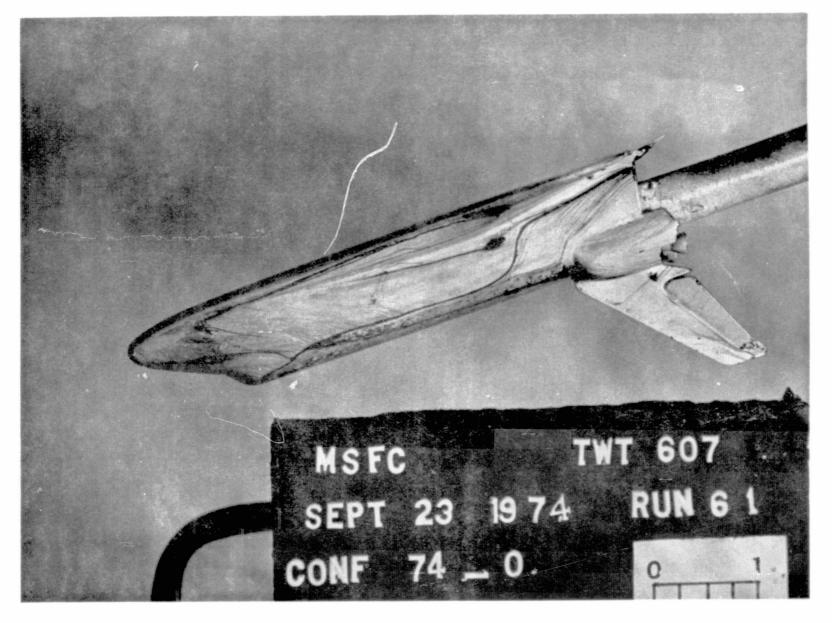
b. Left side view

Figure 51. - Continued.



c. Top view

Figure 51. - Concluded.



a. Right side view

Figure 52. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 25° MACH = 0.9



b. Left side view

Figure 52. - Continued.

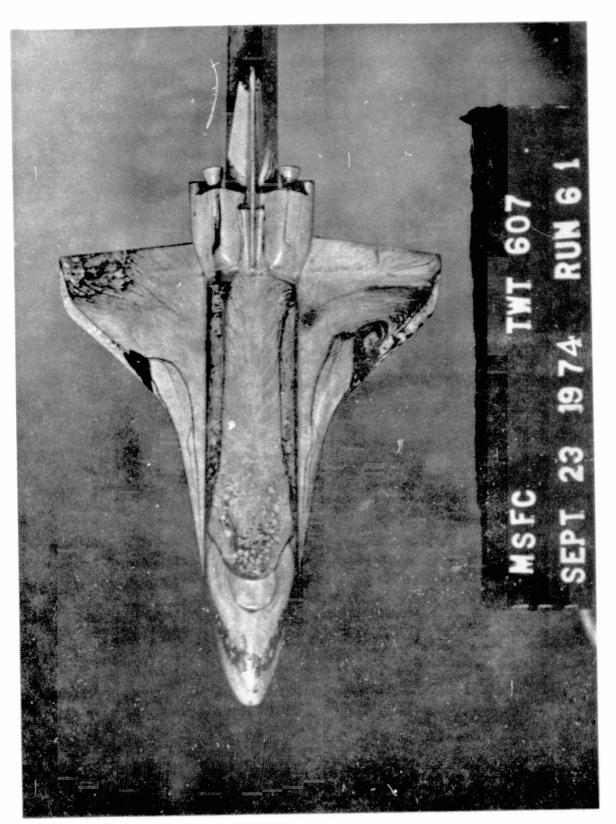


Figure 52. - Concluded.

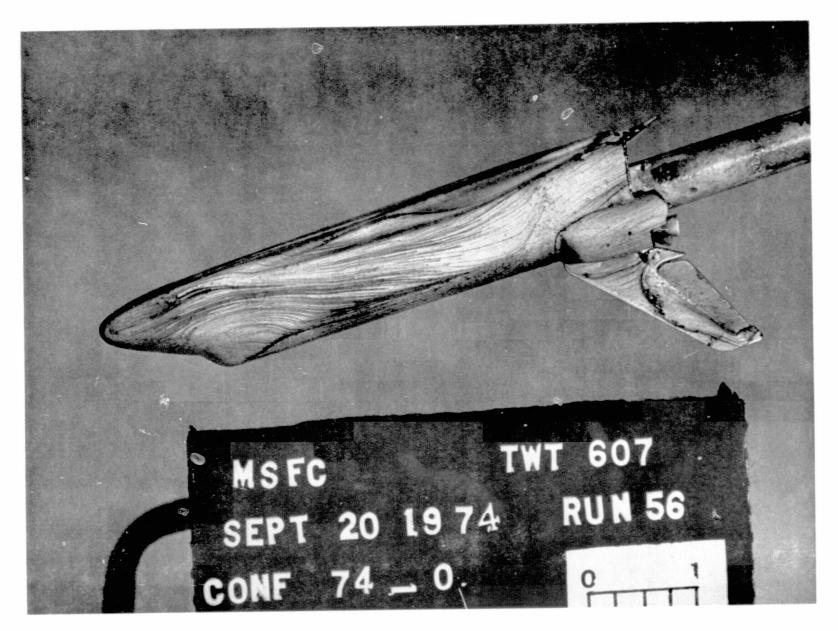
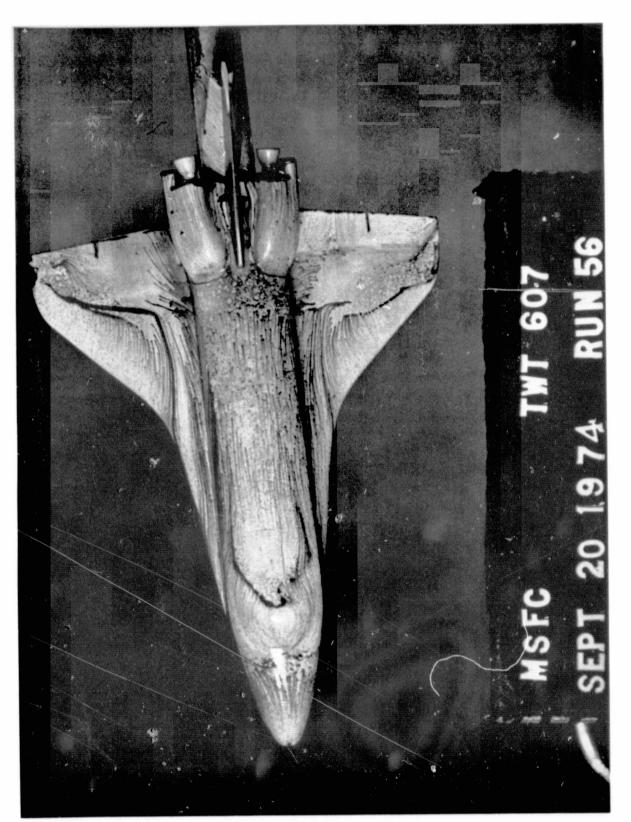


Figure 53. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 5° MACH = 1.10



b. Left side view

Figure 53. - Continued.



c. Top view

Figure 53. - Concluded.

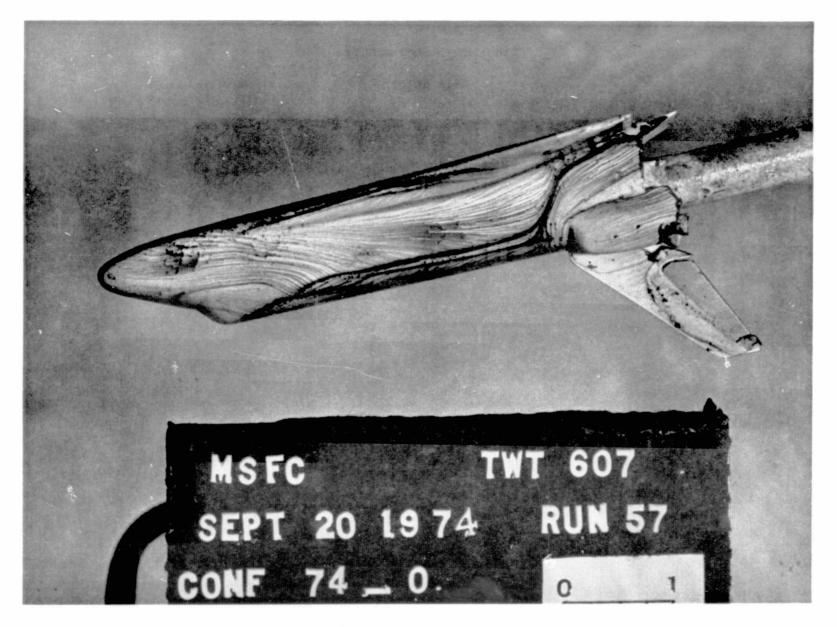


Figure 54. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 10° MACH = 1.10



b. Left side view

Figure 54. - Continued.

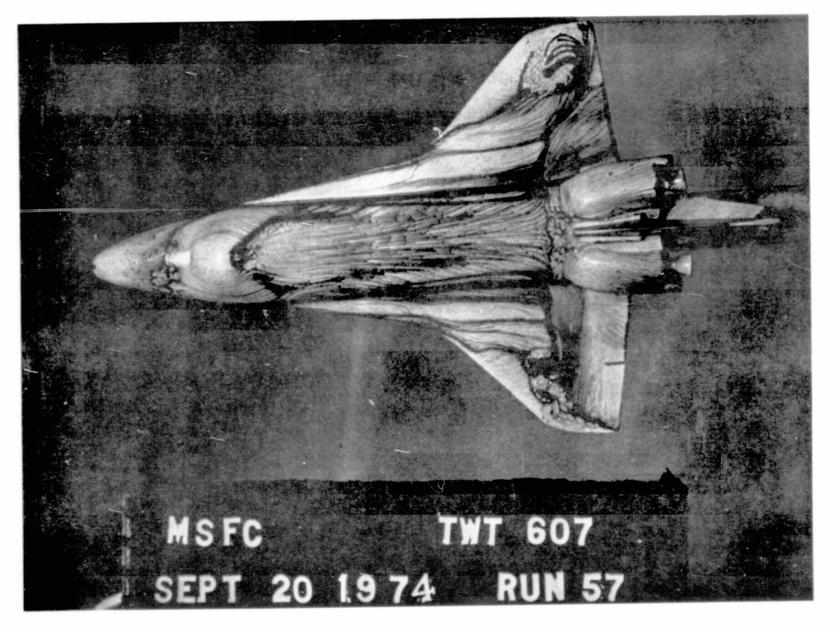
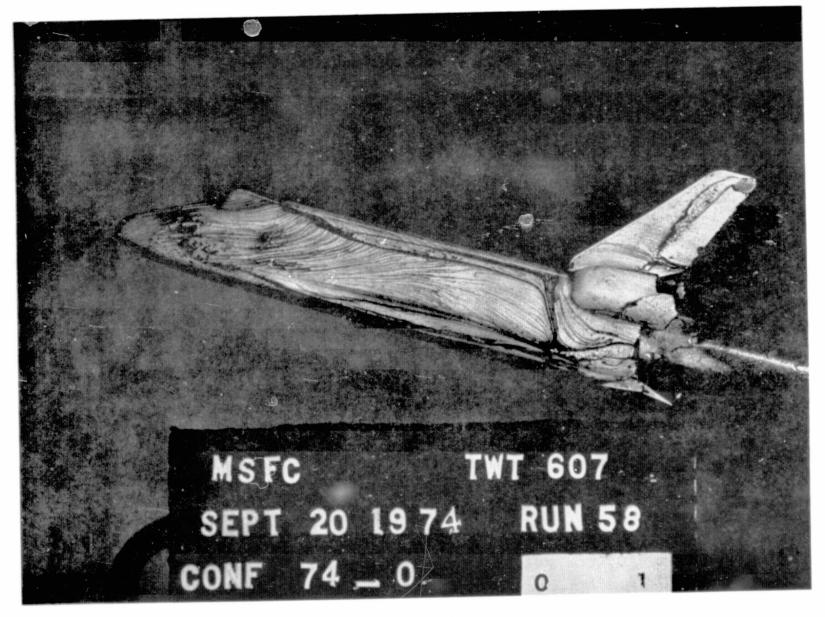


Figure 54. - Concluded.

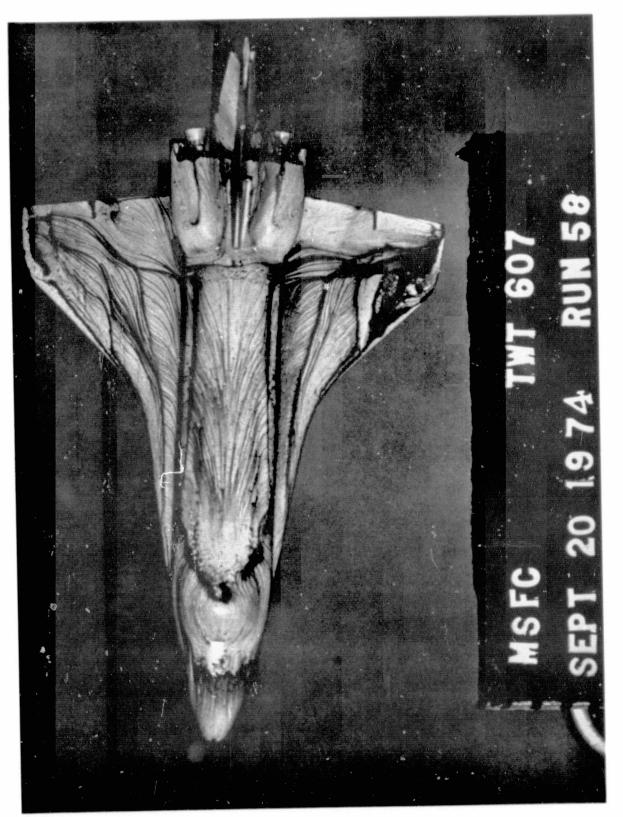


Figure 55. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 15° MACH = 1.10



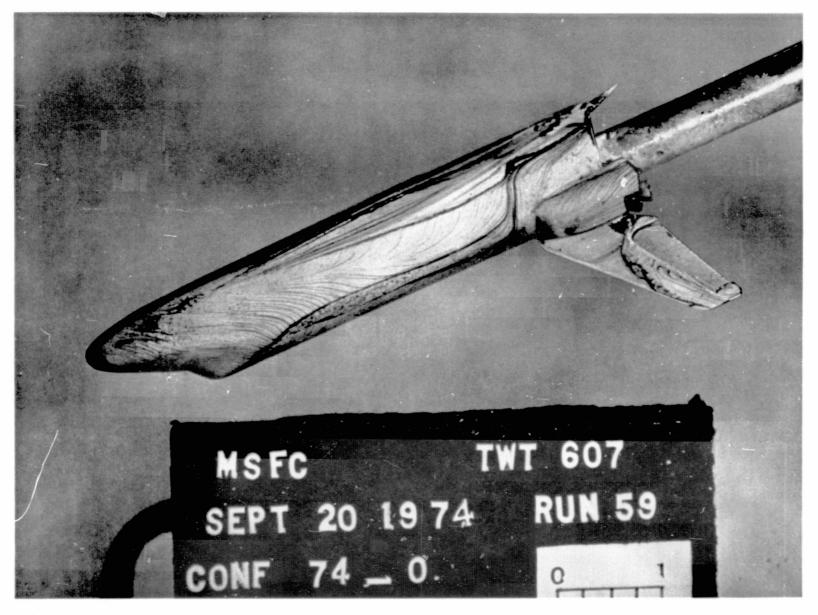
b. Left side view

Figure 55. - Continued.



c. Top view

Figure 55. - Concluded.



a. Right side view

Figure 56. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 20° MACH = 1.10



b. Left side view

Figure 56. - Continued.

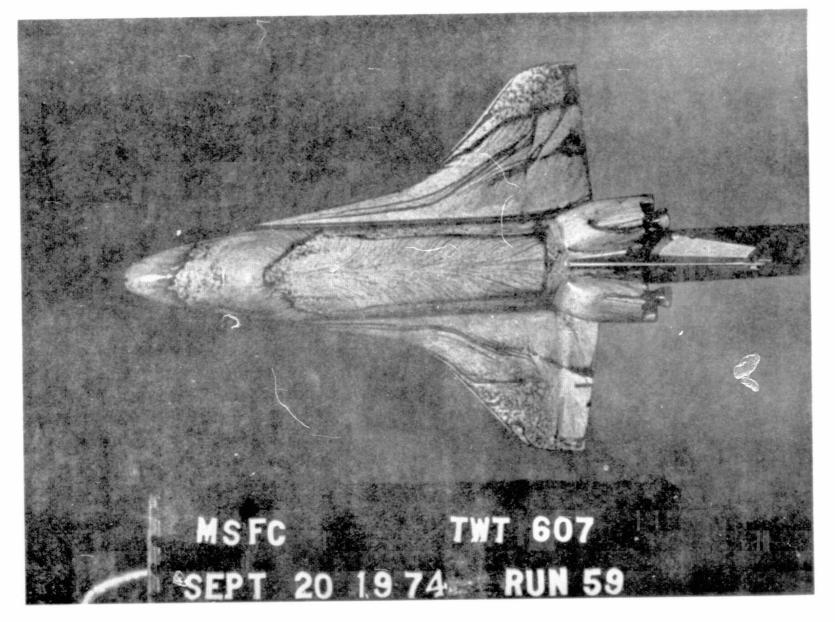
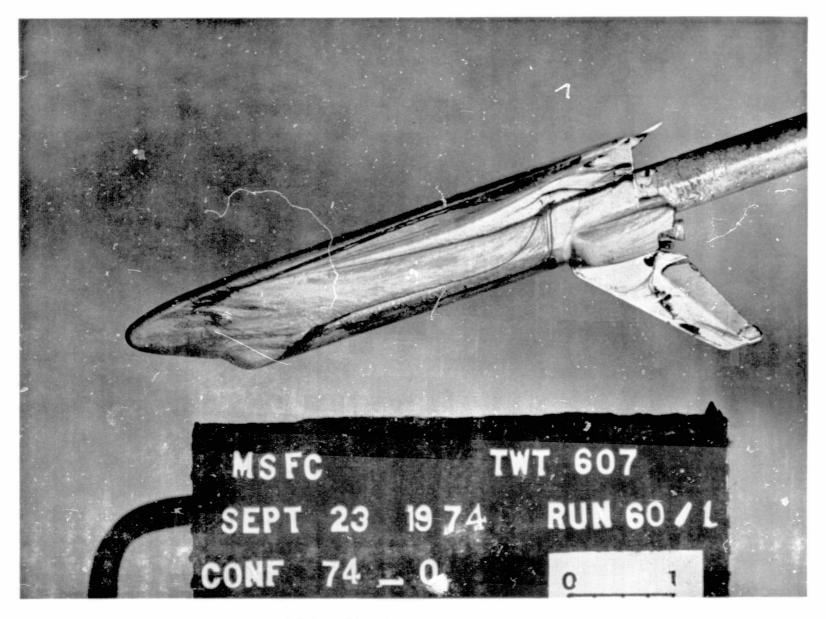


Figure 56. - Concluded.



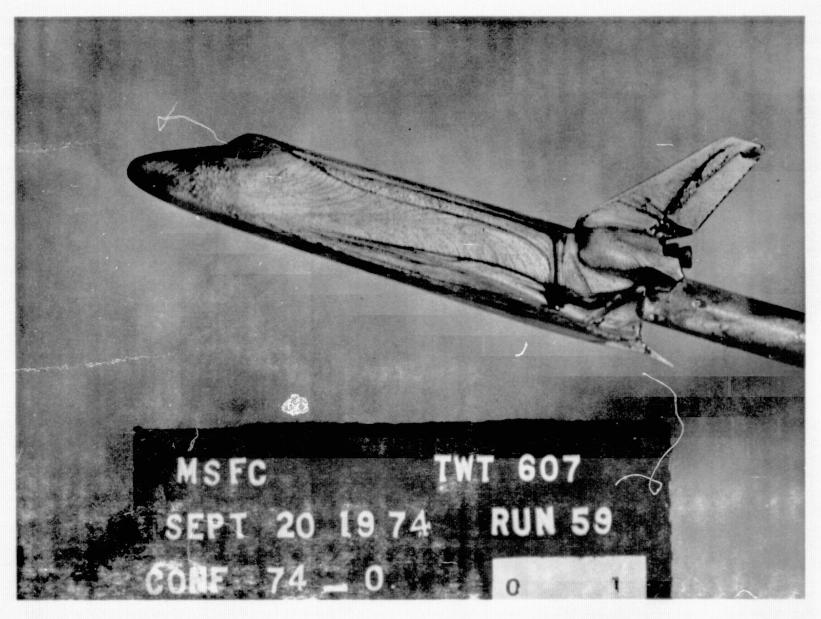
a. Right side view

Figure 57. - ELV-L = -13.5 ELV-R = 7.0 RODDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 25° MACH = 1.10



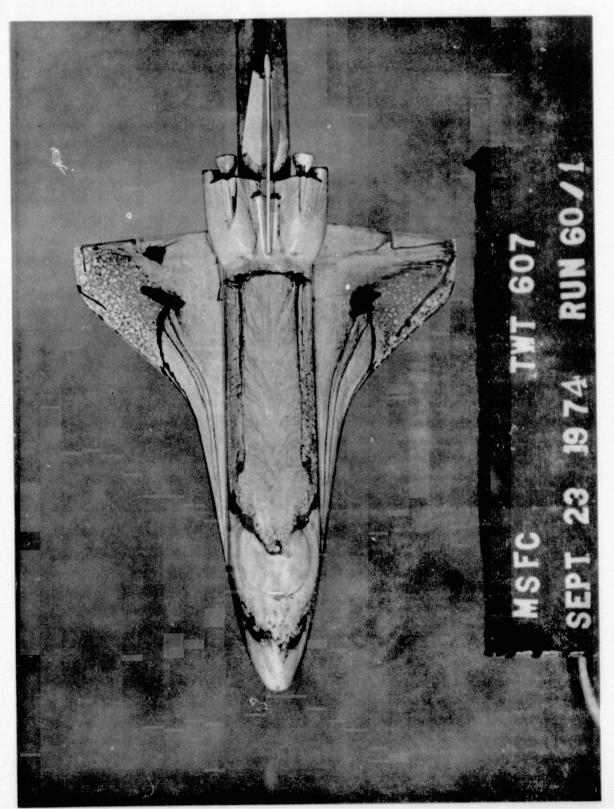
b. Left side view

Figure 57. - Continued.



b. Left side view

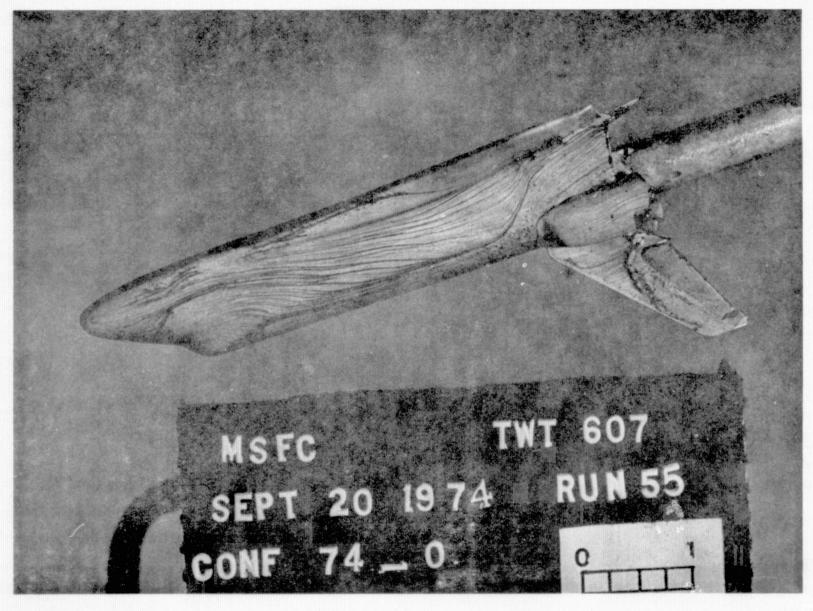
Figure 56. - Continued.



c. Top view

Figure 57. - Concluded.

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a. Right side view

Figure 58. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 5° MACH = 1.25



b. Left side view

Figure 58. - Continued.

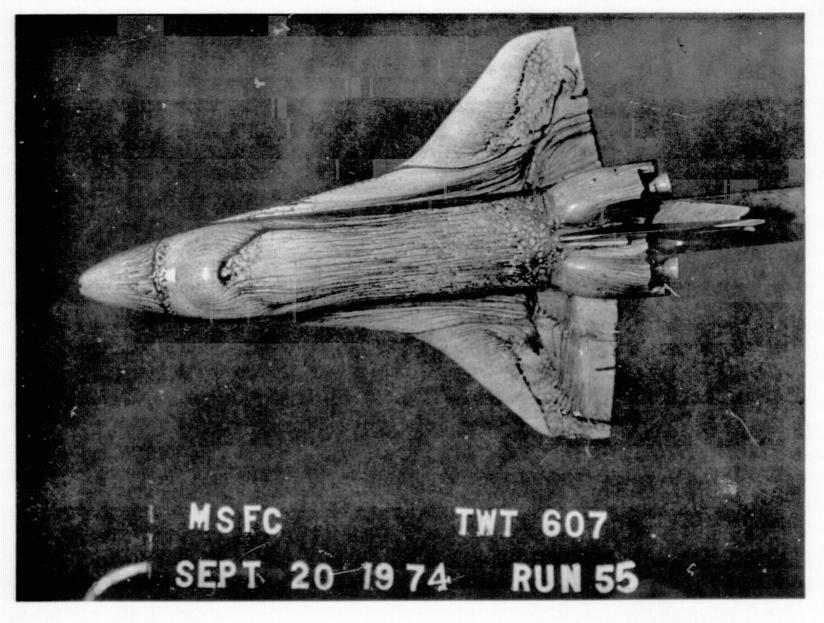
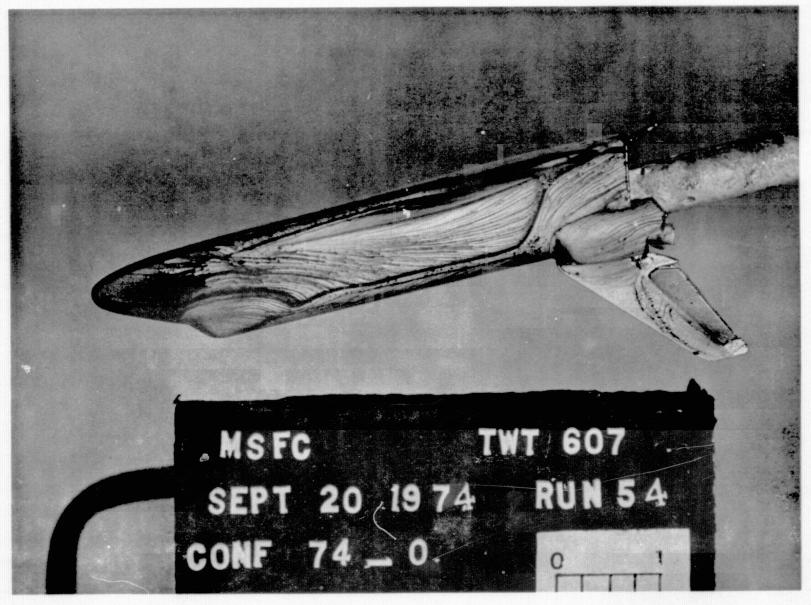


Figure 58. - Concluded.



a. Right side view

Figure 59. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 10° MACH = 1.25

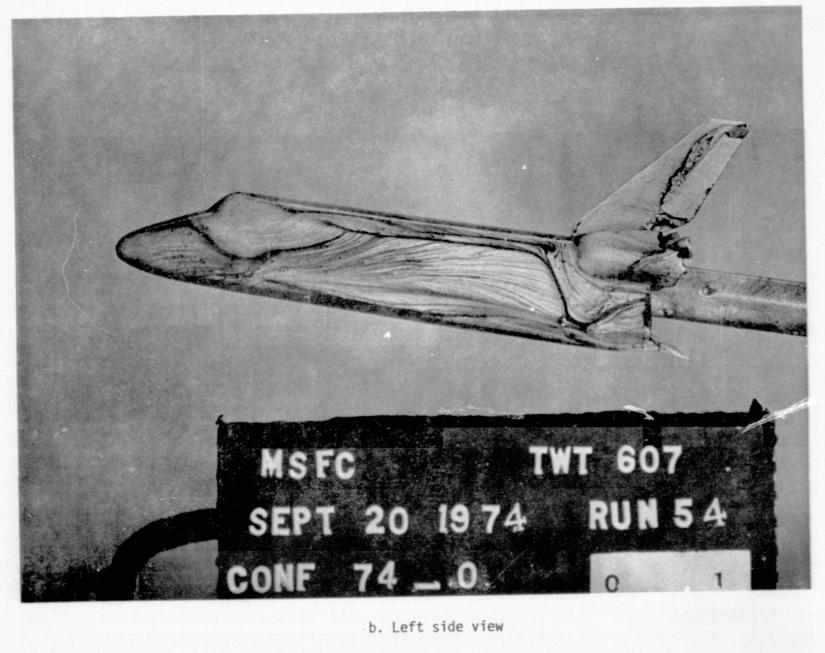
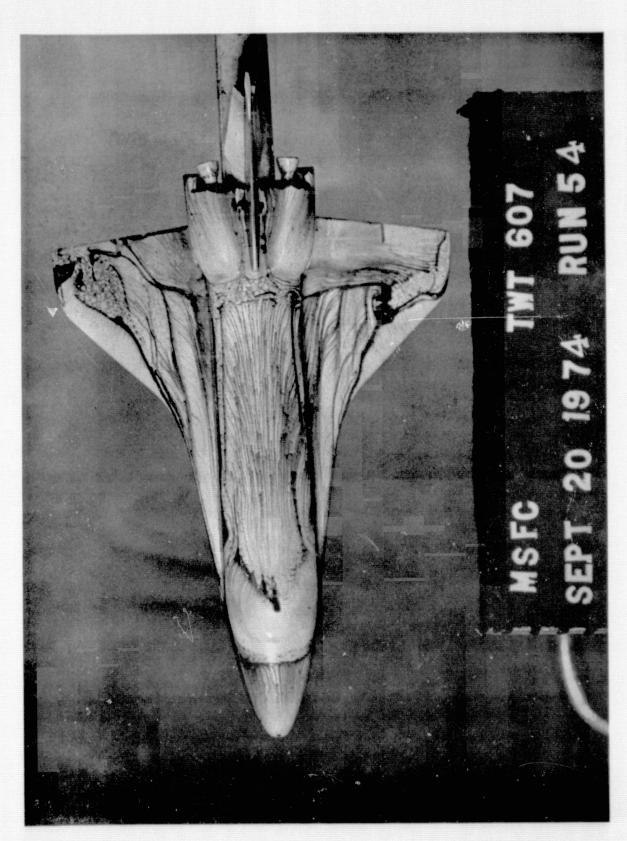


Figure 59. - Continued.



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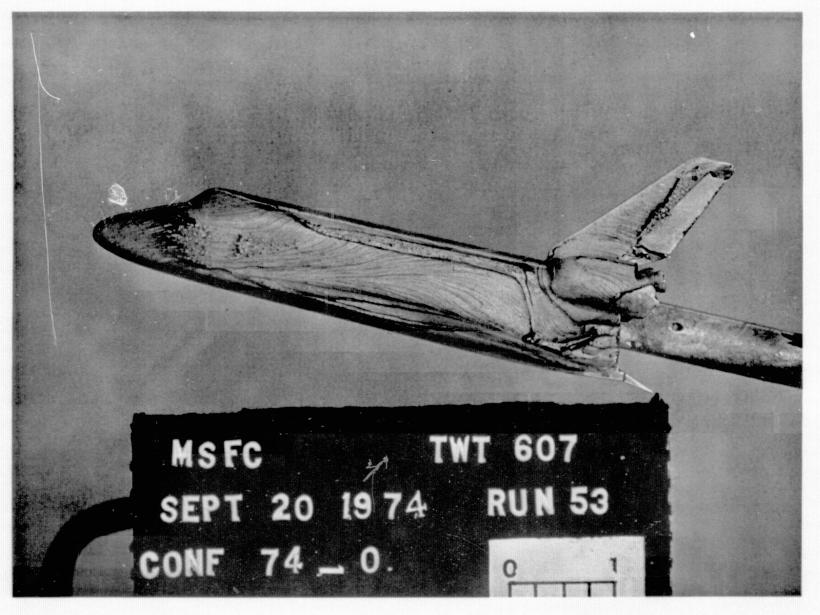
c. Top view

Figure 59. - Concluded.



a. Right side view

Figure 60. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 15° MACH = 1.25



b. Left side viewFigure 60. - Continued.

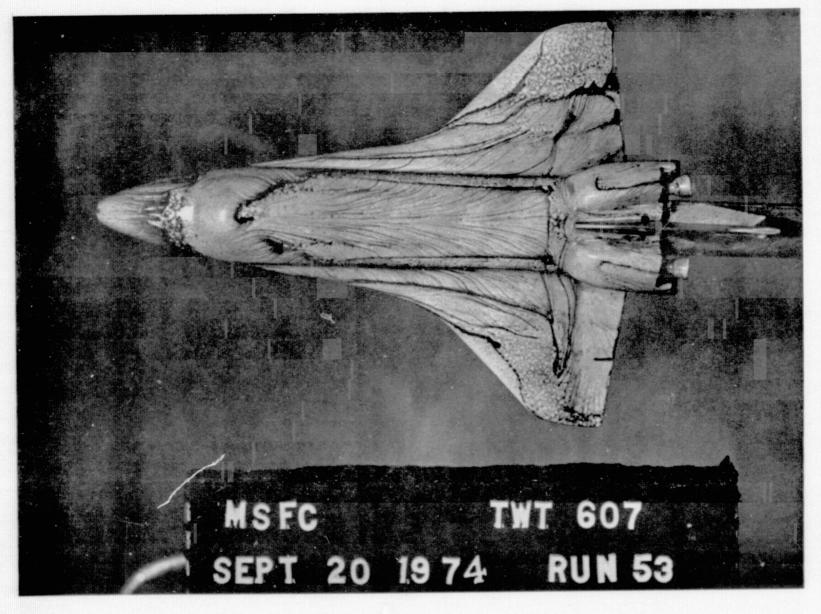


Figure 60. - Concluded.

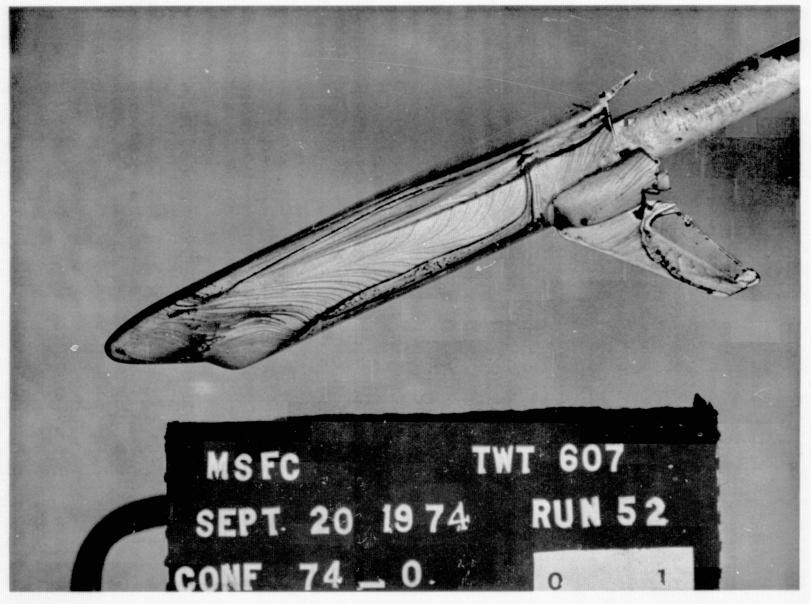
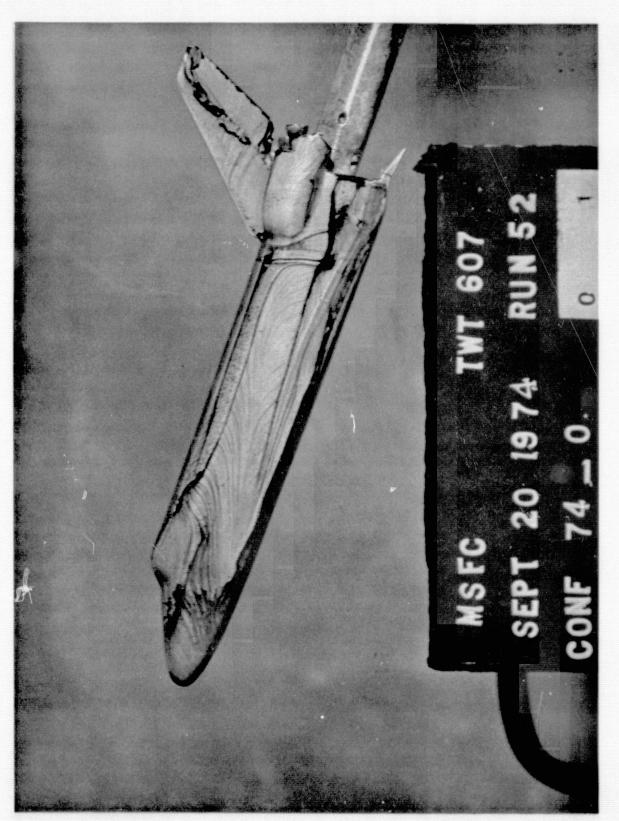
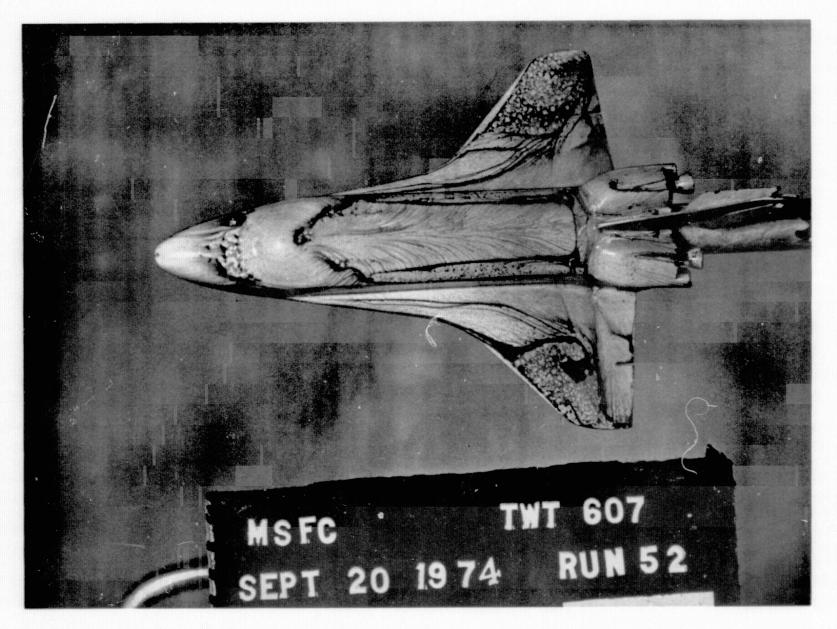


Figure 61. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 20° MACH = 1.25



b. Left side view

Figure 61. - Continued.



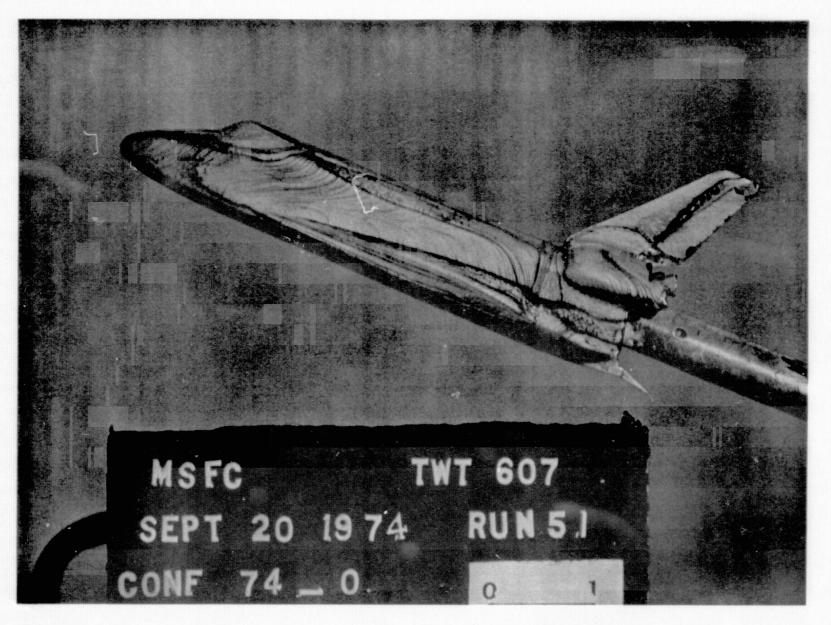
c. Top view

Figure 61. - Concluded.



a. Right side view

Figure 62. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 25° MACH = 1.25

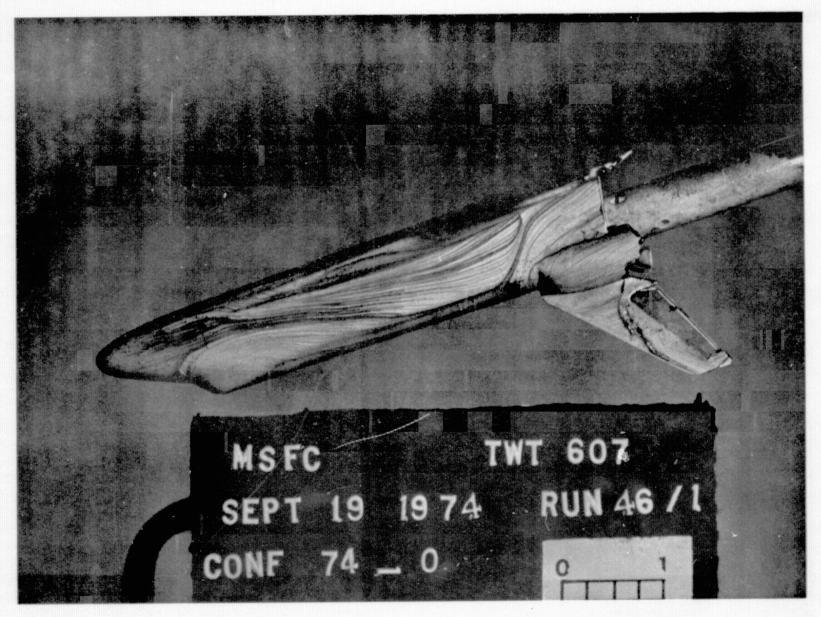


b. Left side viewFigure 62. - Continued.



c. Top view

Figure 62. - Concluded.



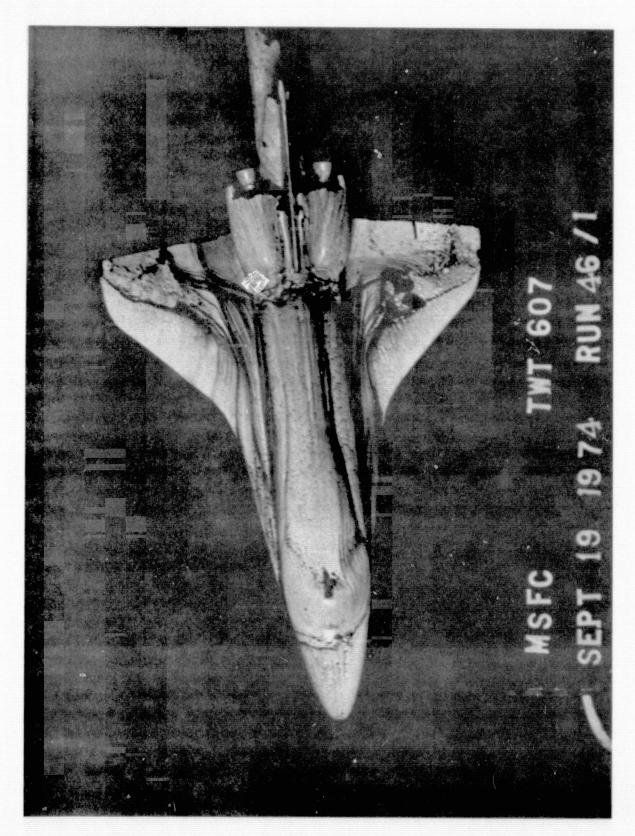
a. Right side view

Figure 63. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 5° MACH = 1.46



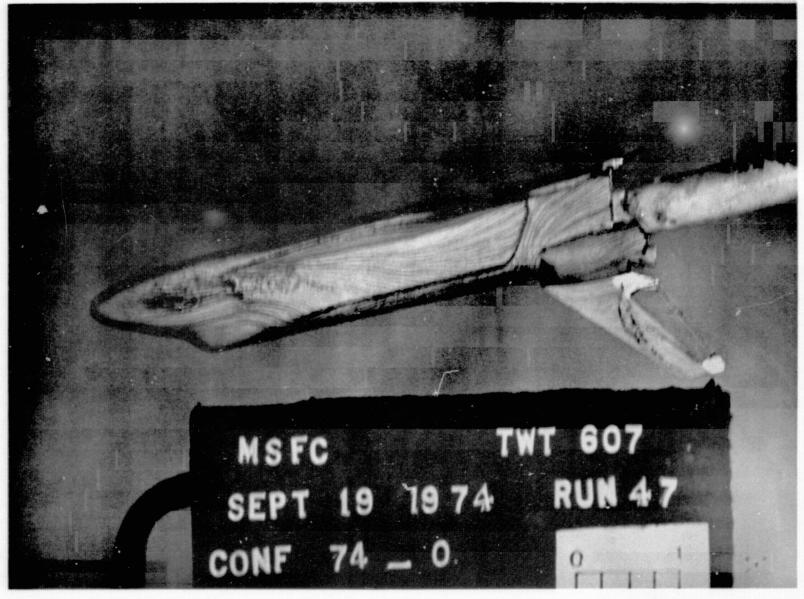
b. Left side view

Figure 63. - Continued.



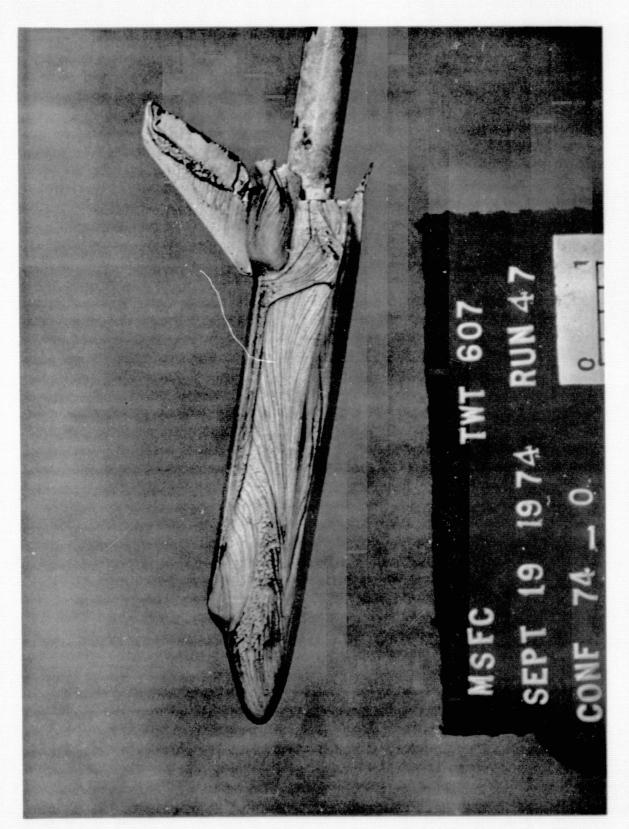
c. Top view

Figure 63. - Concluded.



a. Right side view

Figure 64. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 10° MACH = 1.46



b. Left side view

Figure 64. - Continued.

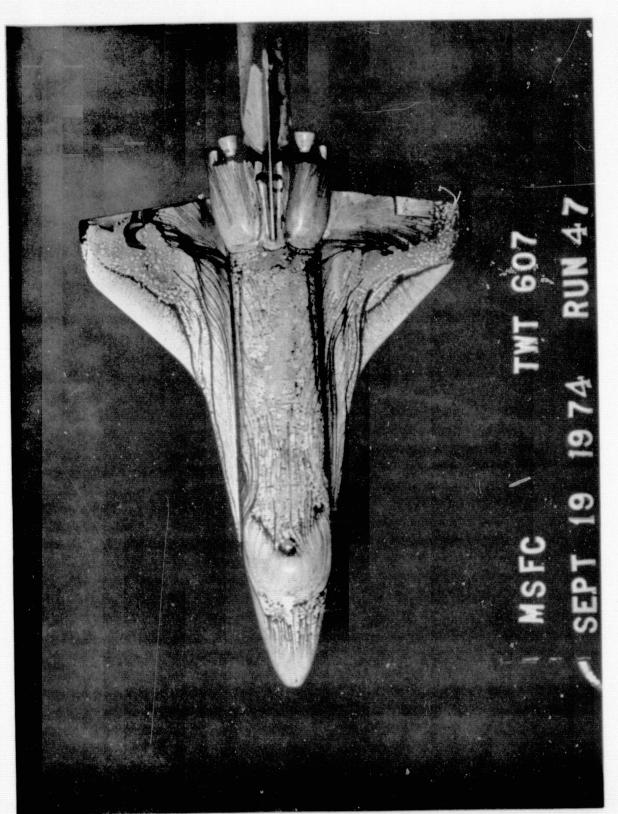
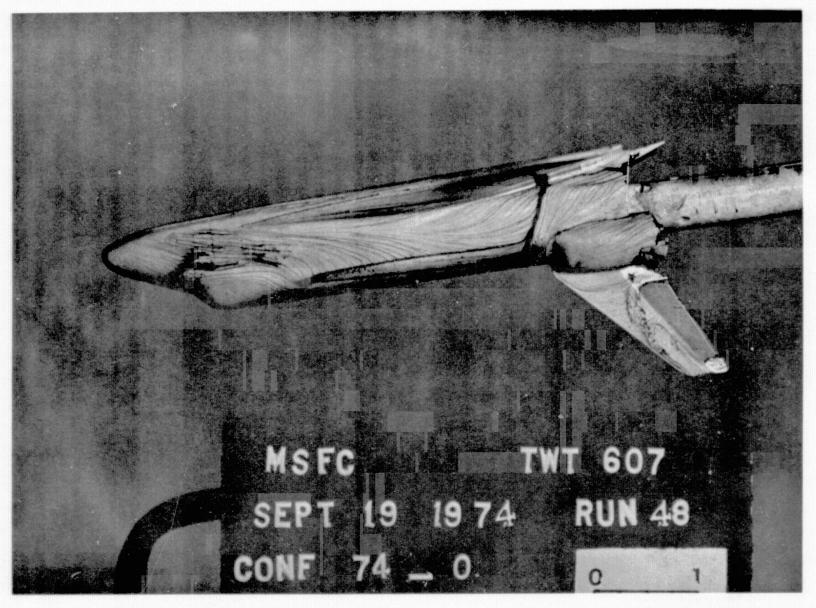


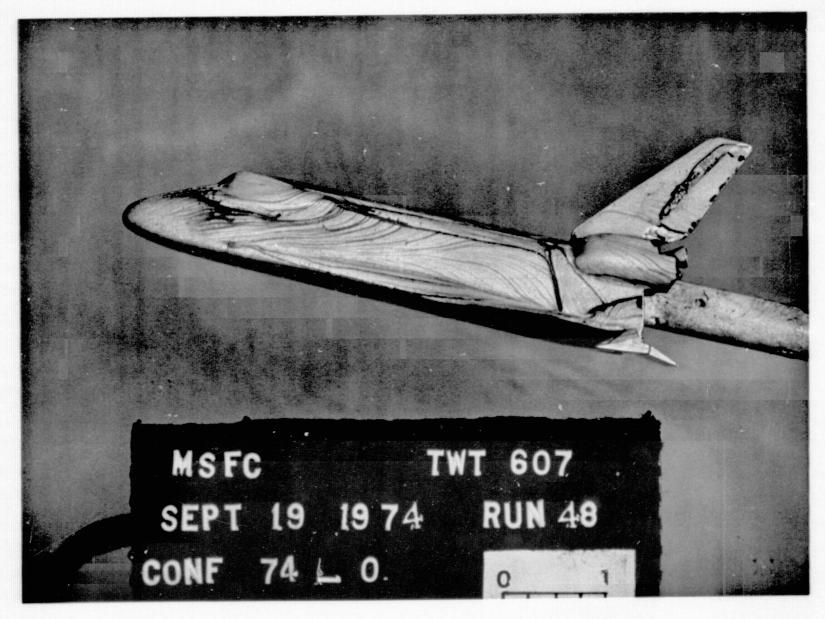
Figure 64. - Concluded.

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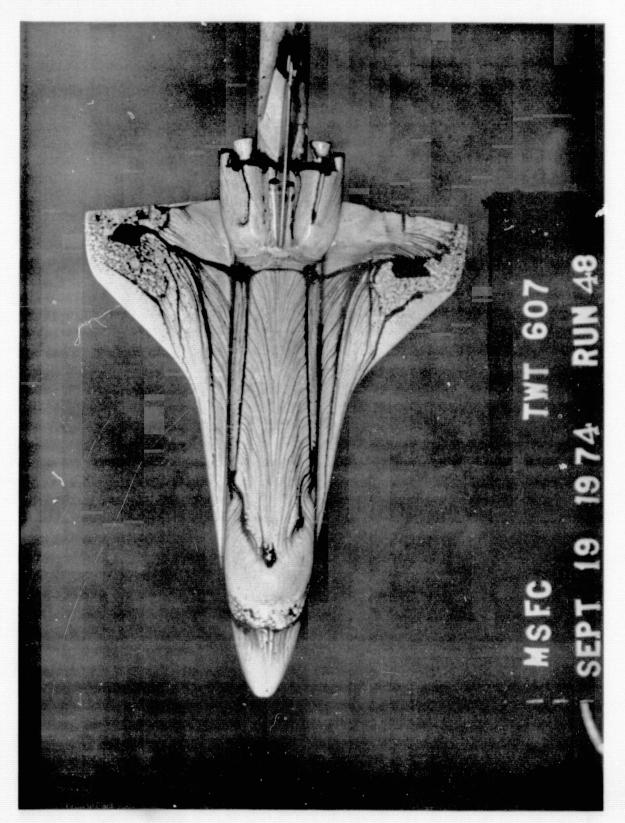
a. Right side view

Figure 65. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 15° MACH = 1.46



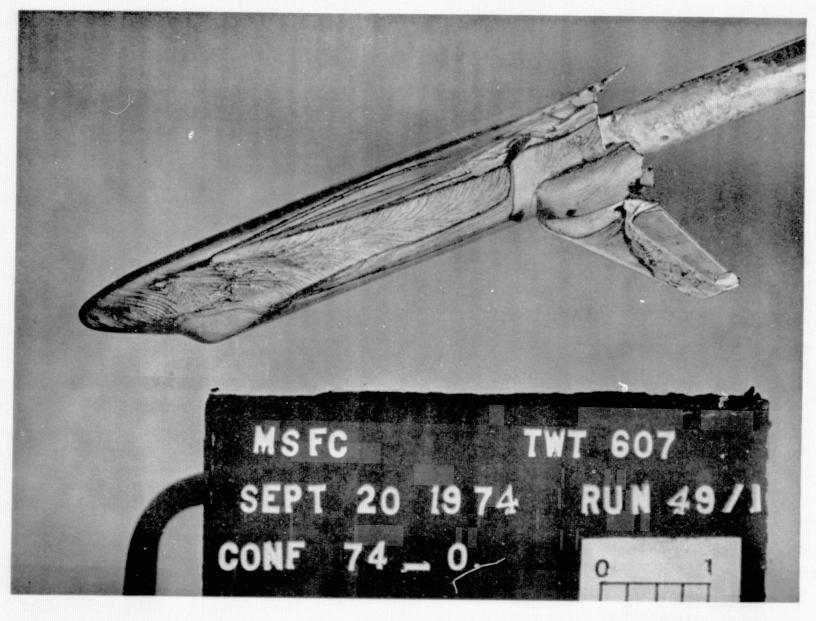
b. Left side view

Figure 65. - Continued.



c. Top view

Figure 65. - Concluded.



a. Right side view

Figure 66. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 20° MACH = 1.46



b. Left side view

Figure 66. - Continued.

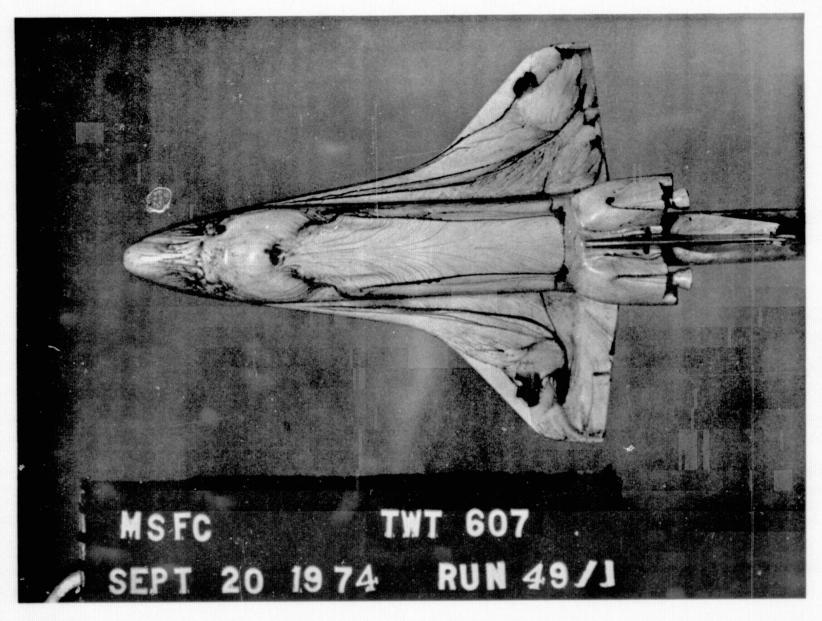
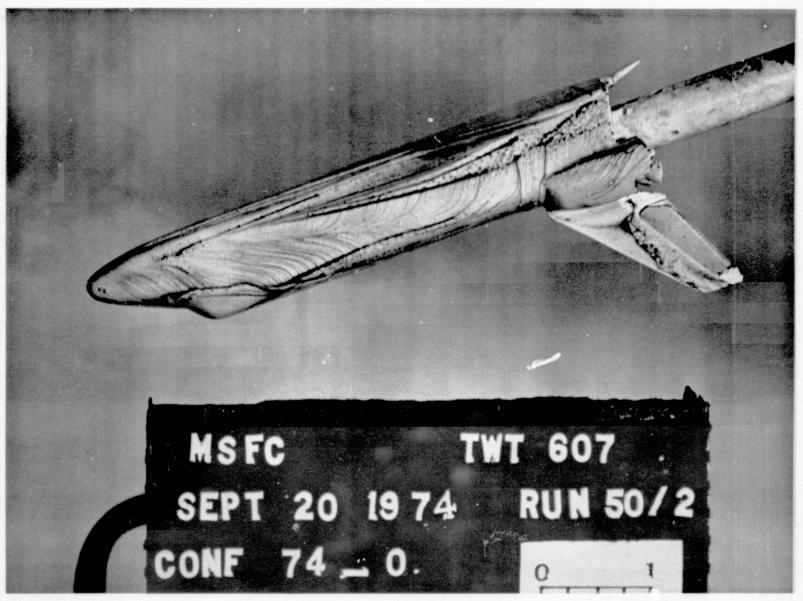
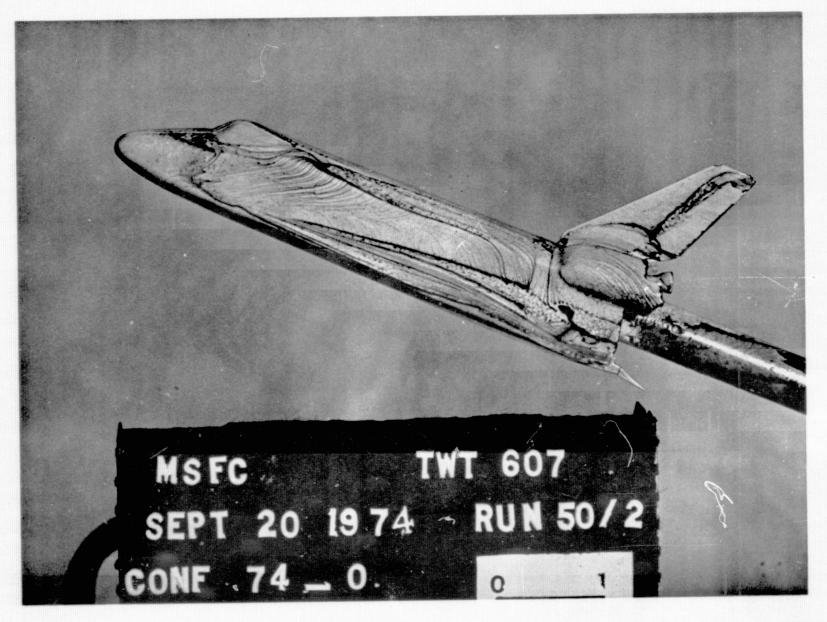


Figure 66. - Concluded.



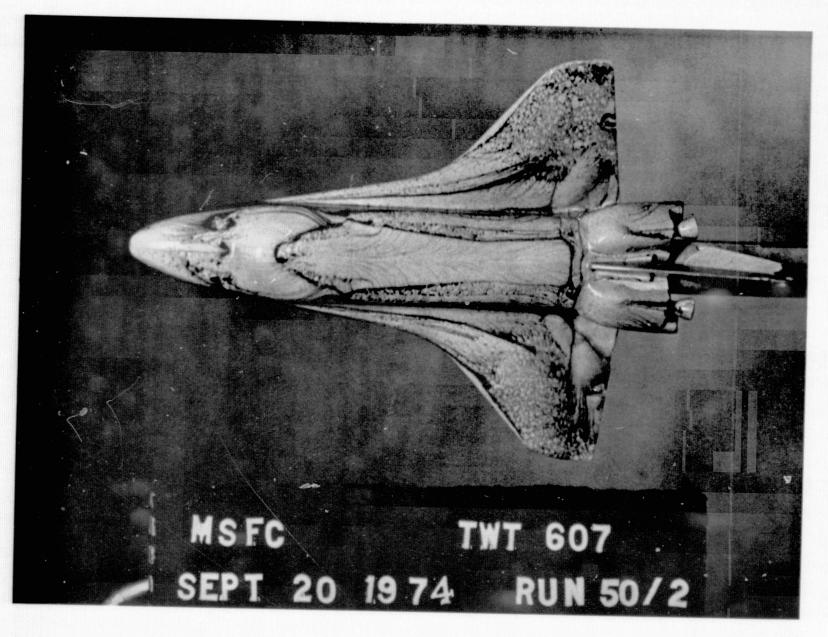
a. Right side view

Figure 67. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 25° MACH = 1.46



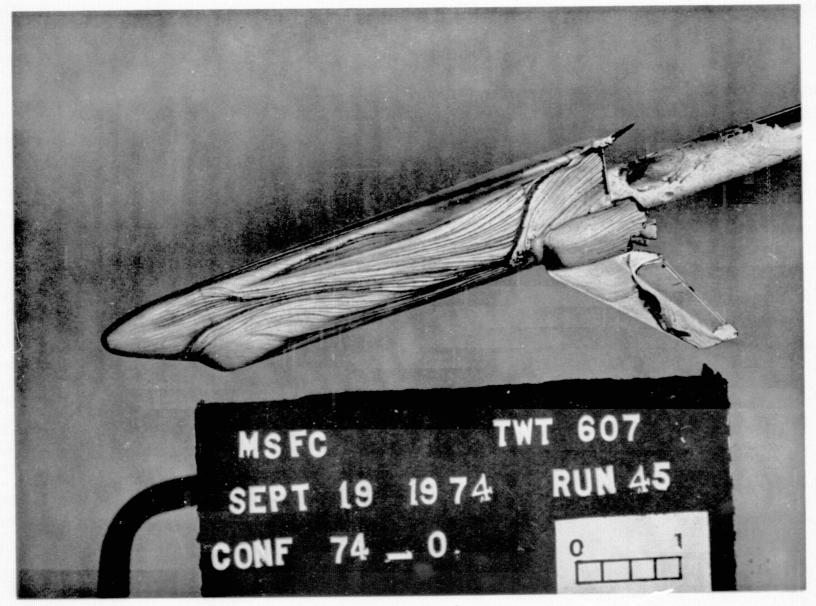
b. Left side view

Figure 67. - Continued.



c. Top view

Figure 67. - Concluded.

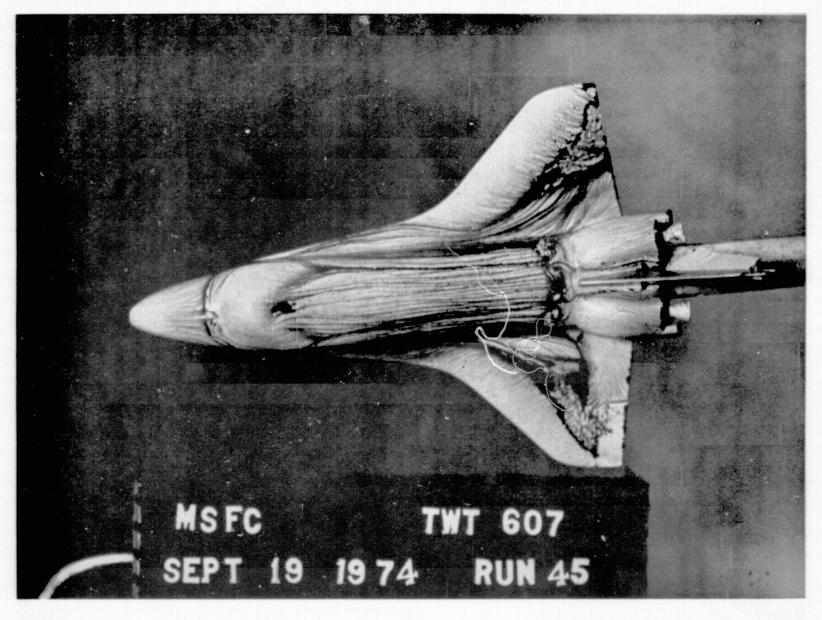


a. Right side view

Figure 68. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 5° MACH = 1.96



b. Left side viewFigure 68. - Continued.

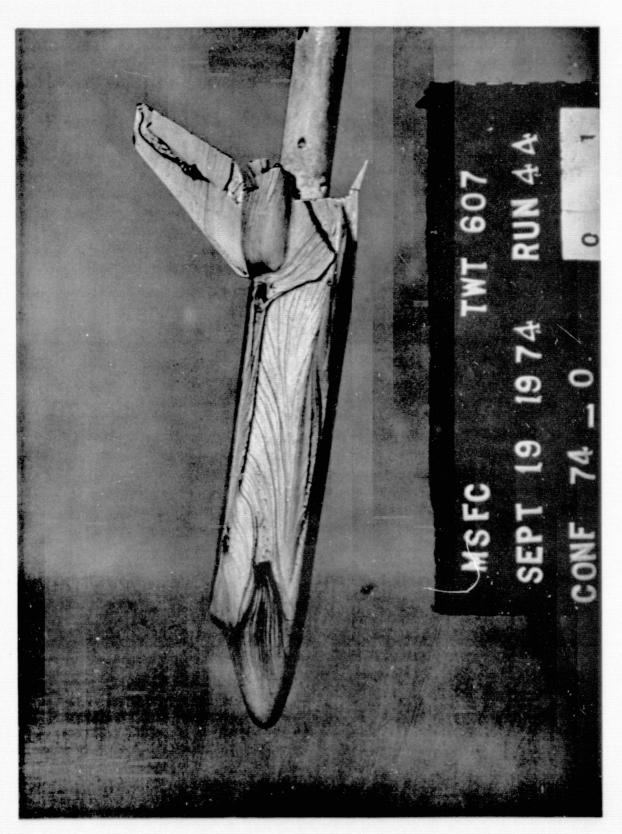


c. Top viewFigure 68. - Concluded.



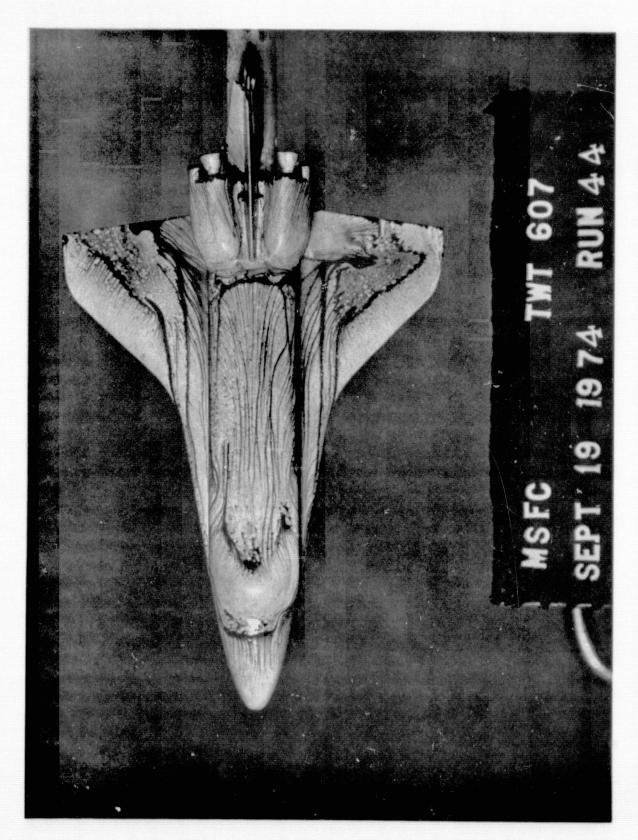
a. Right side view

Figure 69. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 10° MACH = 1.96



b. Left side view

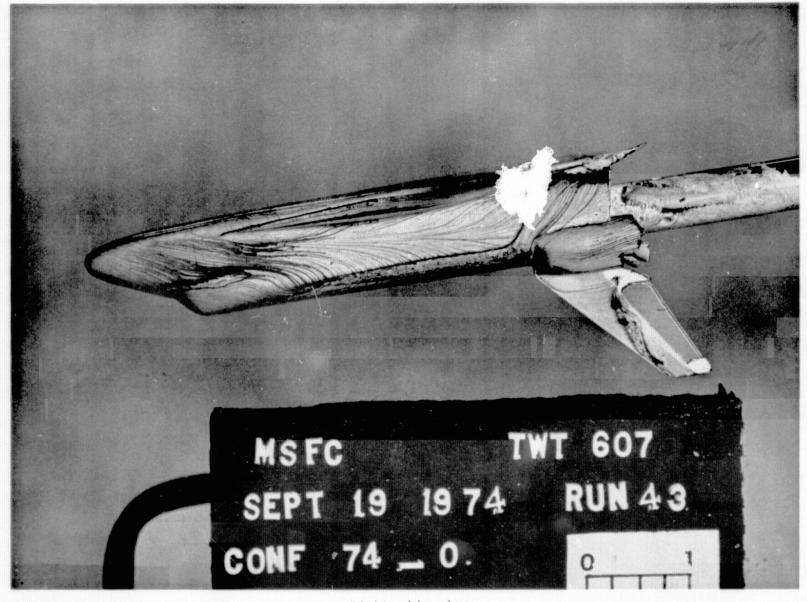
Figure 69. - Continued.



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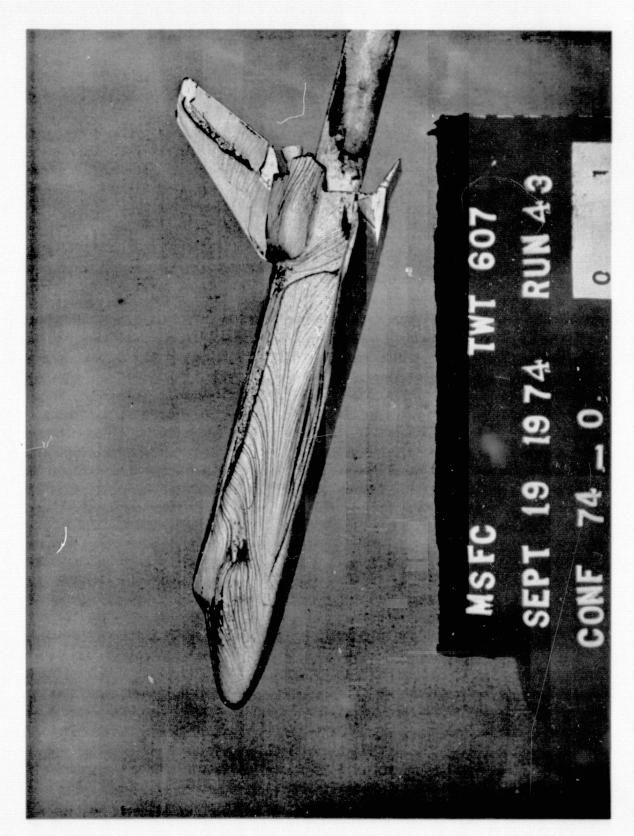
c. Top view

Figure 69. - Concluded.



a. Right side view

Figure 70. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 15° MACH = 1.96



b. Left side view

Figure 70. - Continued.

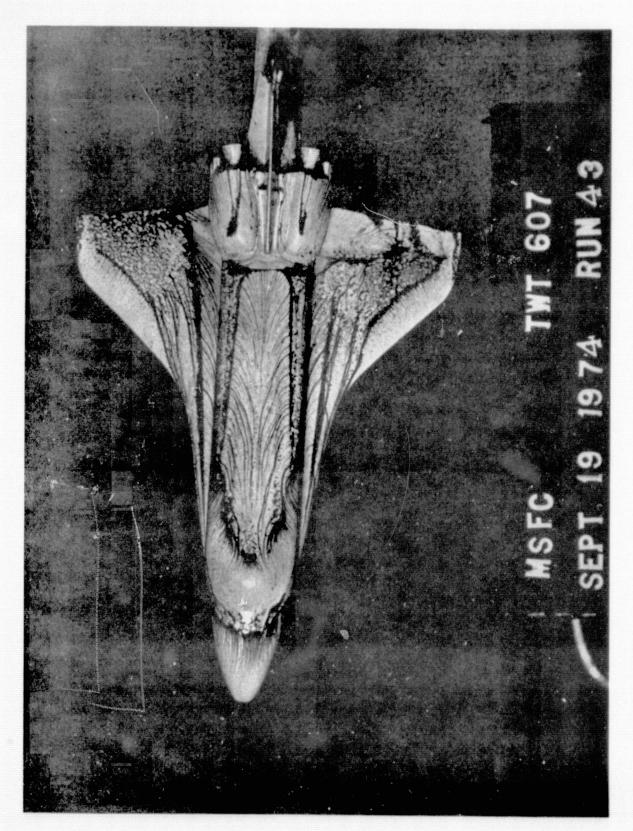
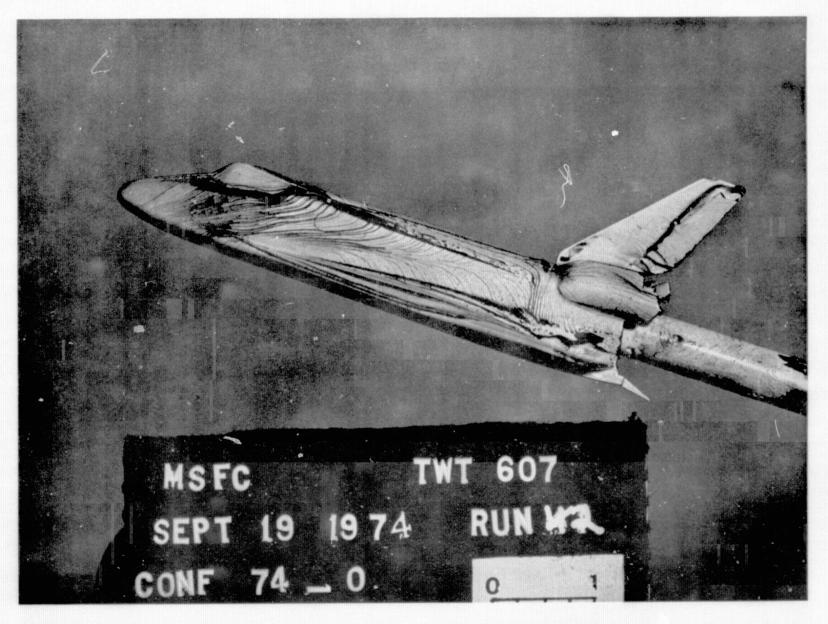


Figure 70. - Continued.



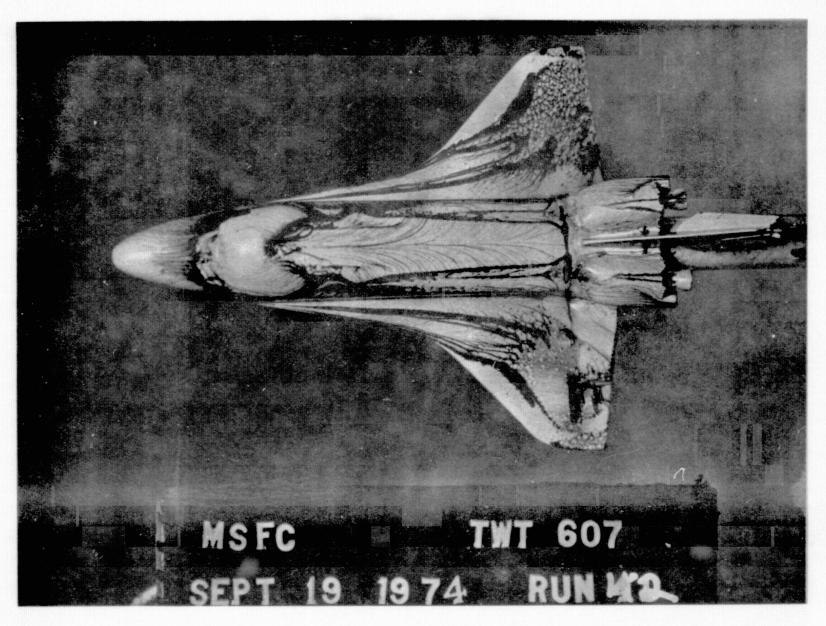
a. Right side view

Figure 71. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 20° MACH = 1.96



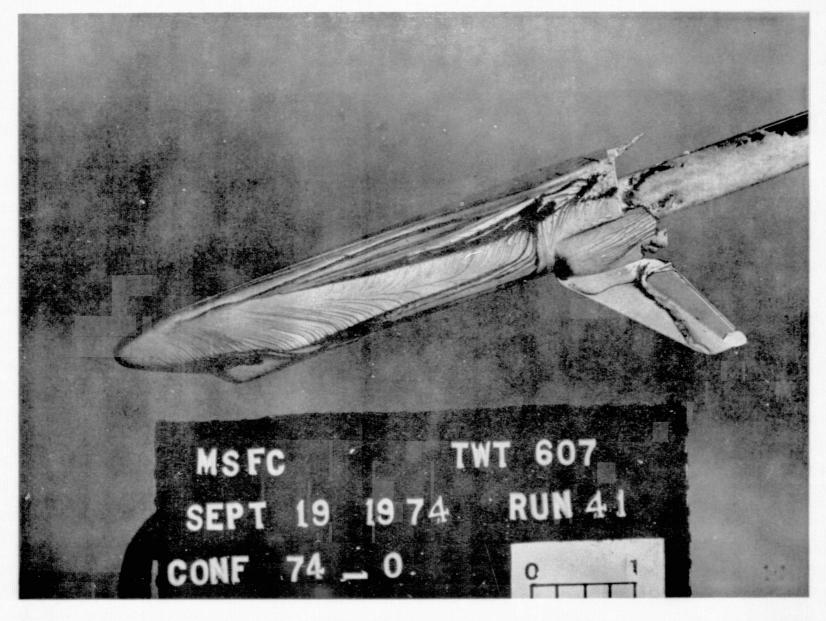
b. Left side view

Figure 71. - Continued.



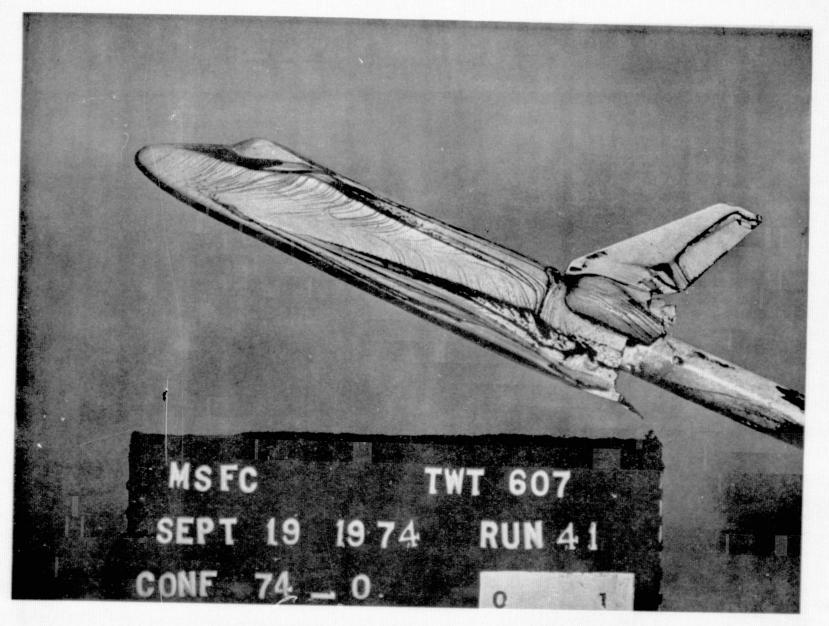
c. Top view

Figure 71. - Concluded.



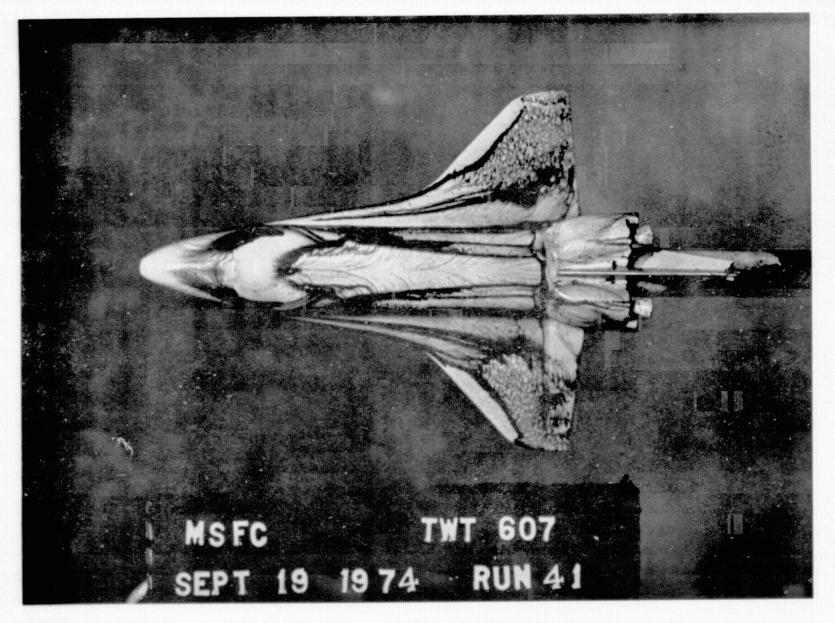
a. Right side view

Figure 72. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 25° MACH = 1.96



b. Left side view

Figure 72. - Continued.



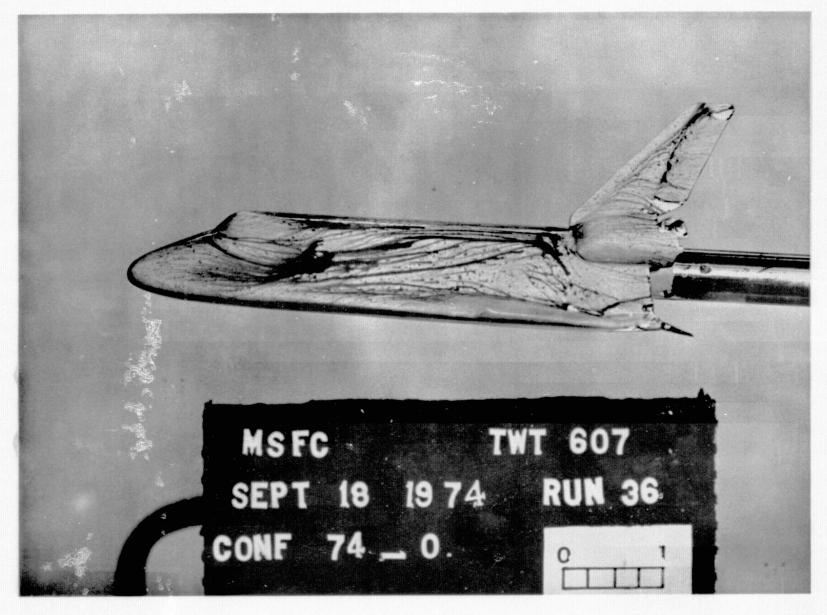
c. Top view

Figure 72. - Concluded.



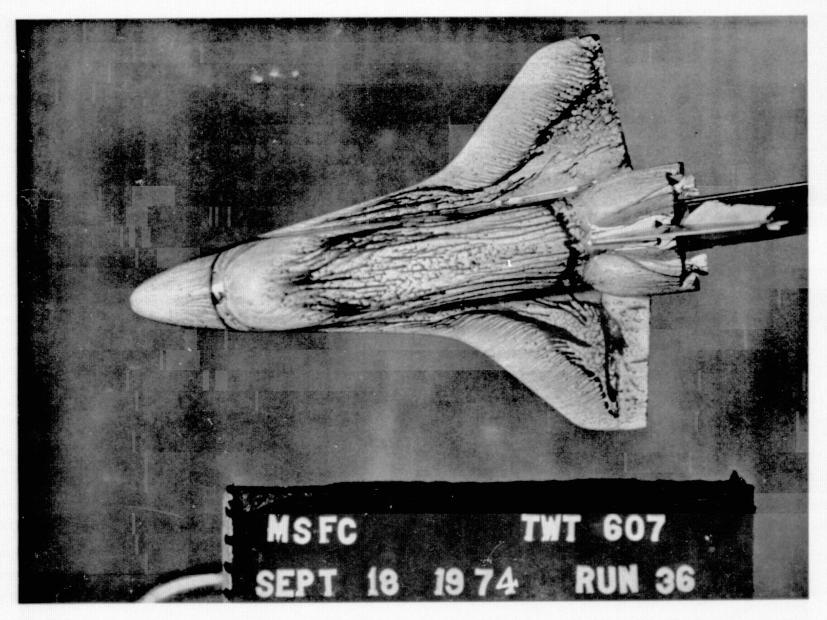
a. Right side view

Figure 73. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 5° MACH = 2.75



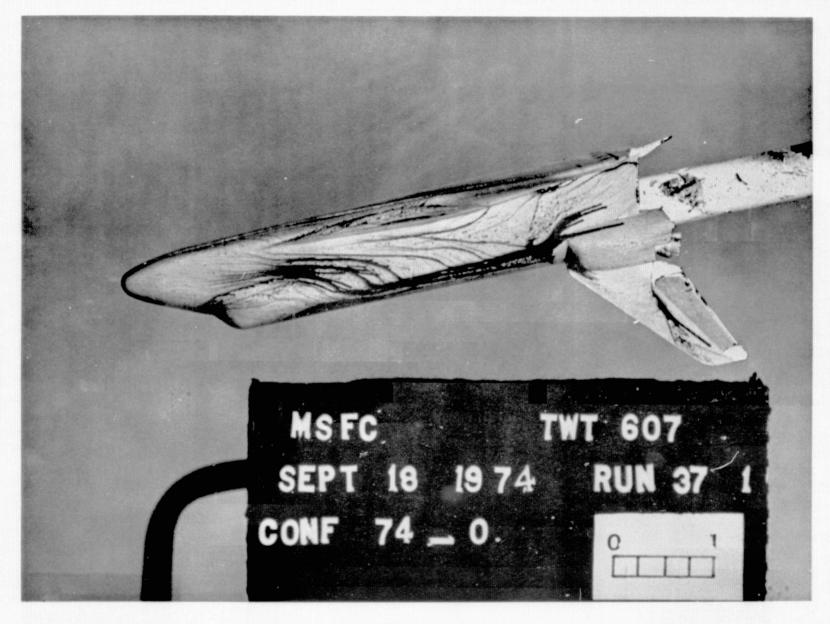
b. Left side view

Figure 73. - Continued.



c. Top view

Figure 73. - Concluded.



a. Right side view

Figure 74. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 10° MACH = 2.75



b. Left side view

Figure 74. - Continued.

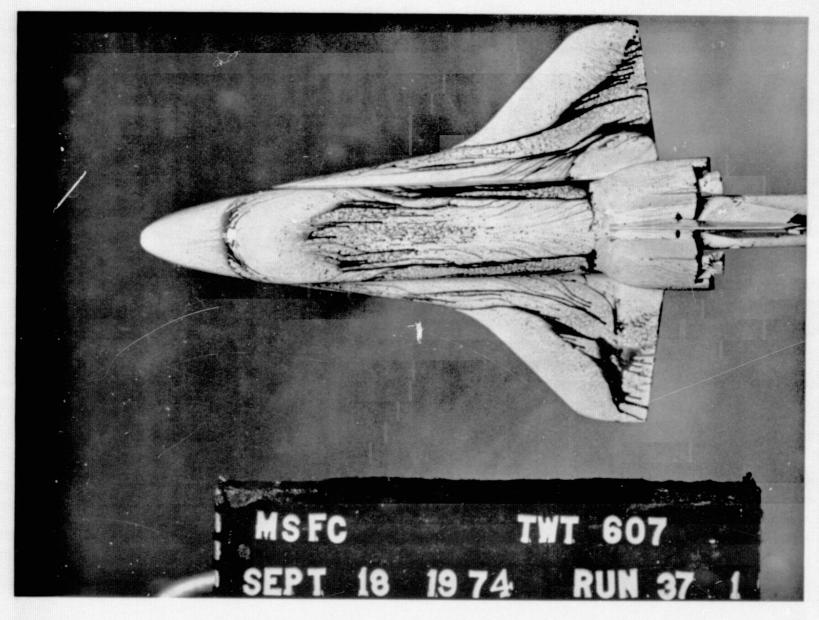
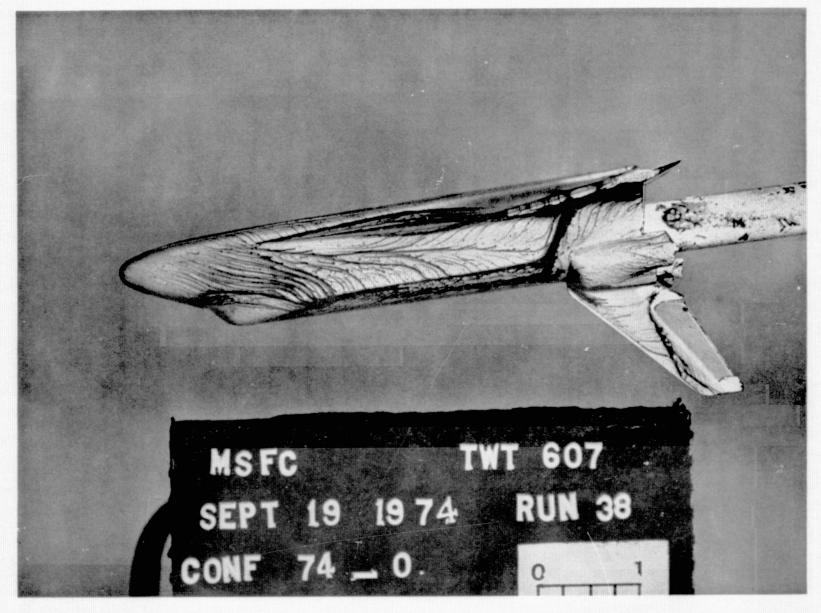
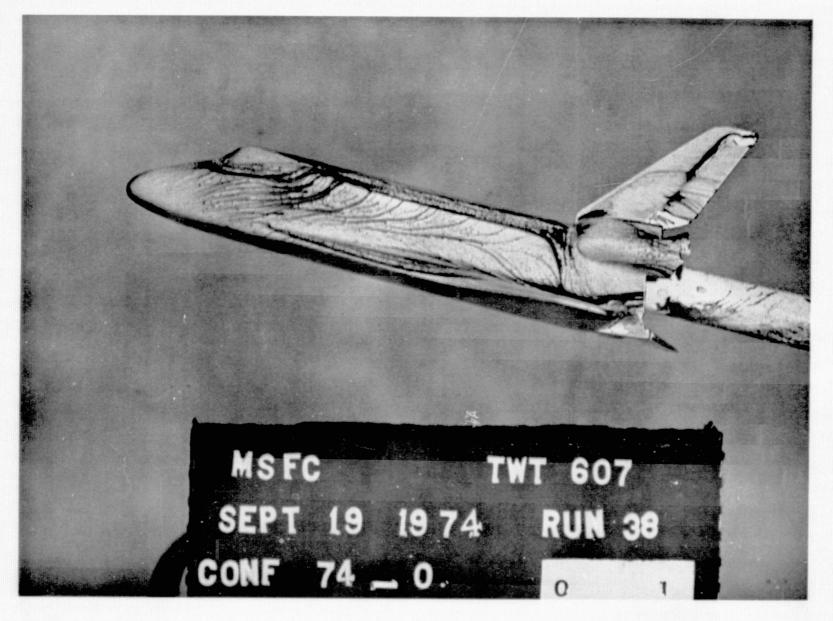


Figure 74. - Concluded.



a. Right side view

Figure 75. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 15° MACH = 2.75



b. Left side view

Figure 75. - Continued.

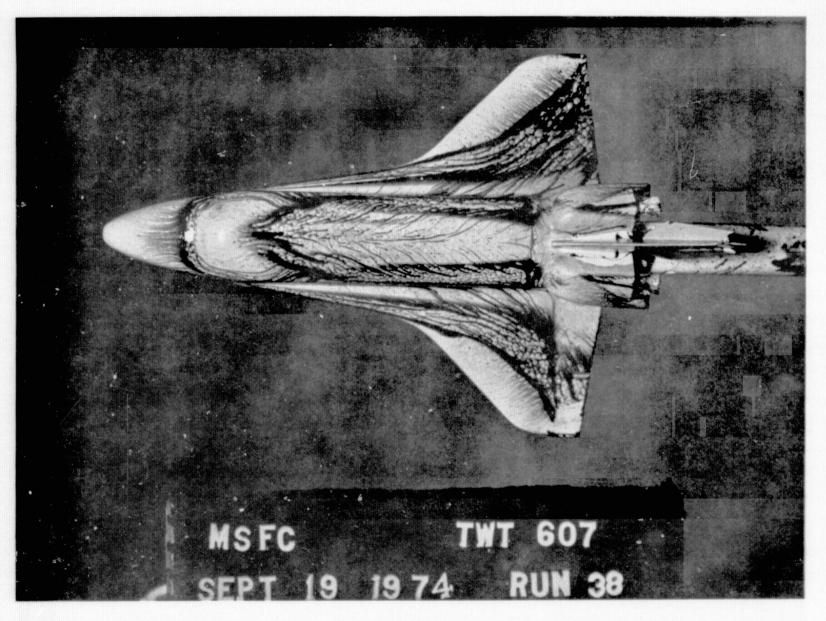
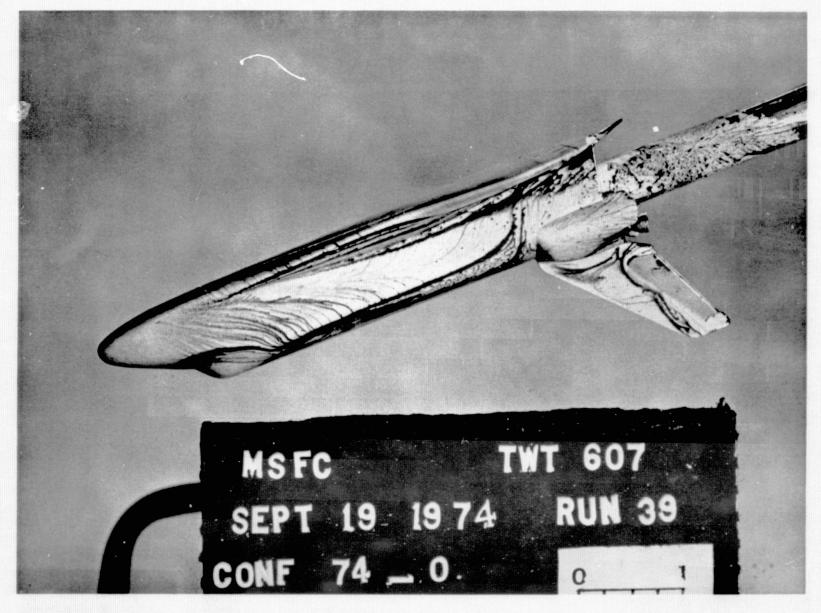
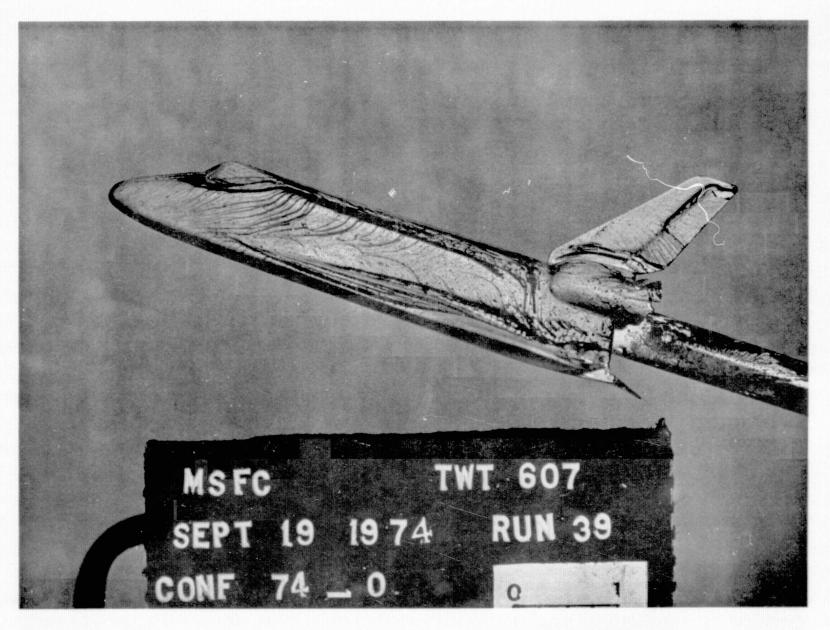


Figure 75. - Concluded.



a. Right side view

Figure 76. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 20° MACH = 2.75



b. Left side view

Figure 76. - Continued.

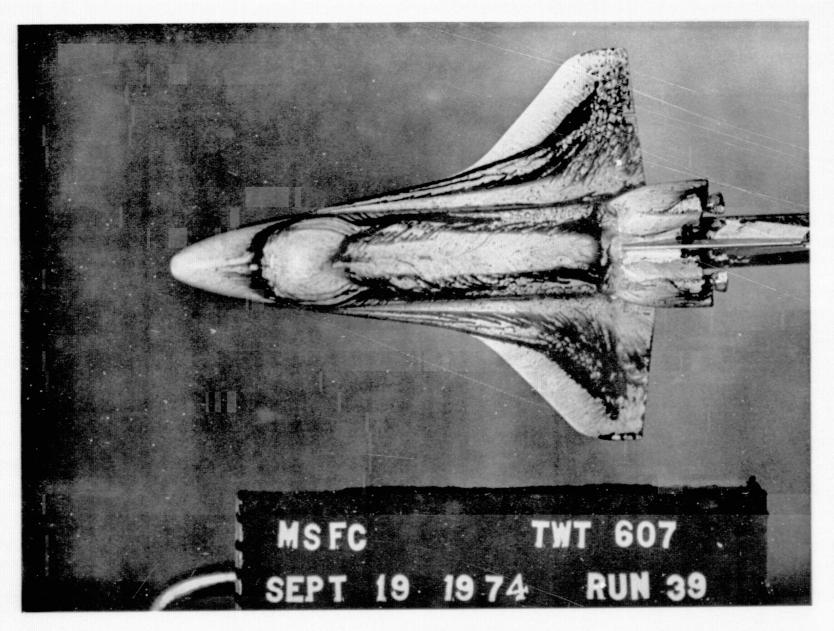
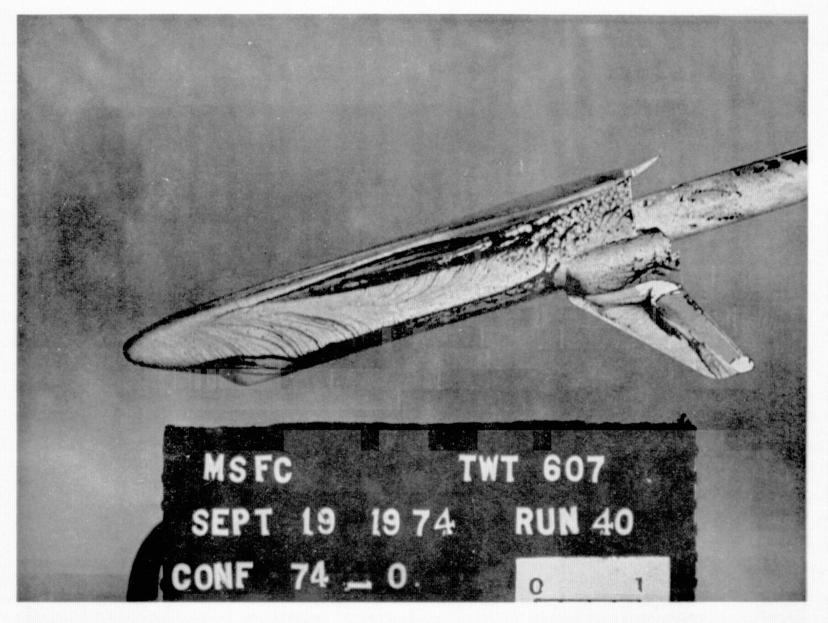
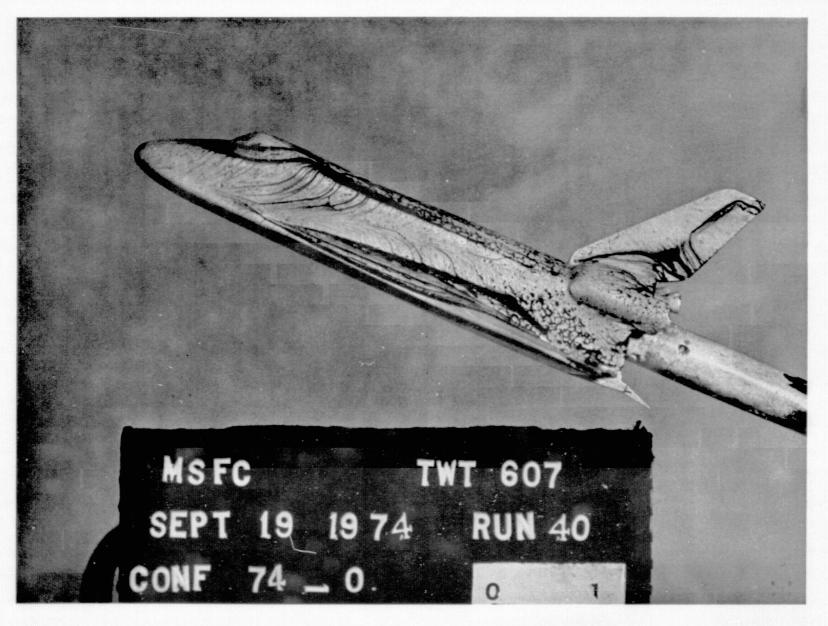


Figure 76. - Concluded.



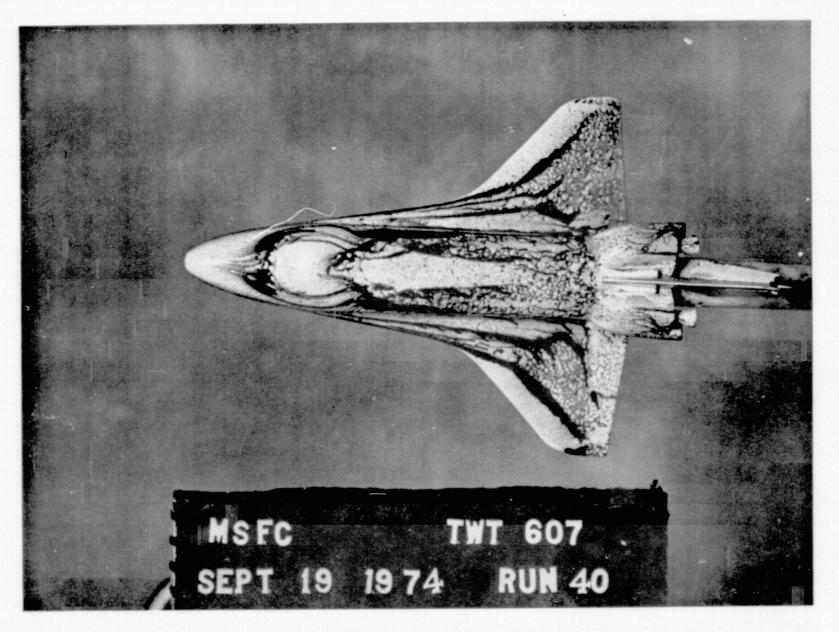
a. Right side view

Figure 77. - ELV-L = -13.5 ELV-R = 7.0 RUDDER = -10.0 SPDBRK = 57.8 BDFLAP = 16.2 ALPHA = 25° MACH = 2.75



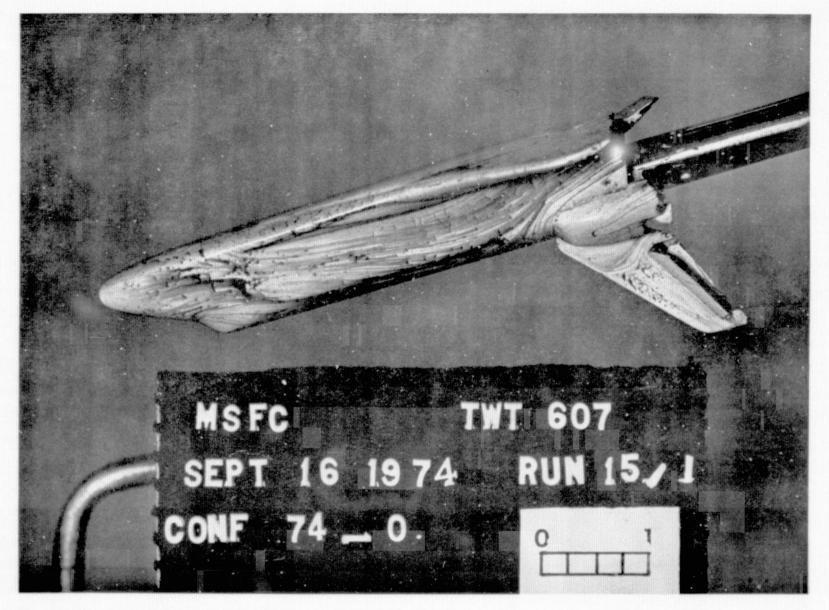
b. Left side view

Figure 77. - Continued.



c. Top view

Figure 77. - Concluded.



a. Right side view

Figure 78. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 5° MACH = 0.6



b. Left side view

Figure 78. - Continued.

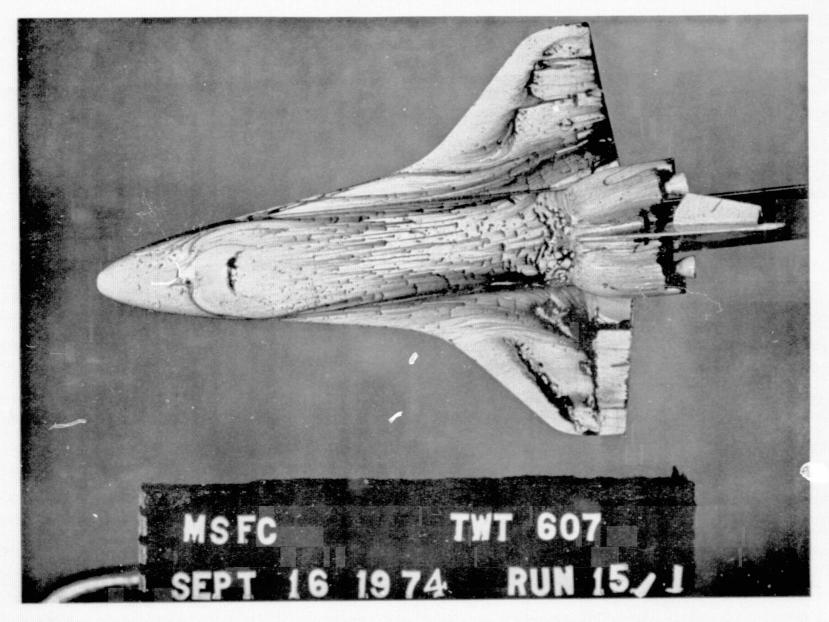


Figure 78. - Concluded.

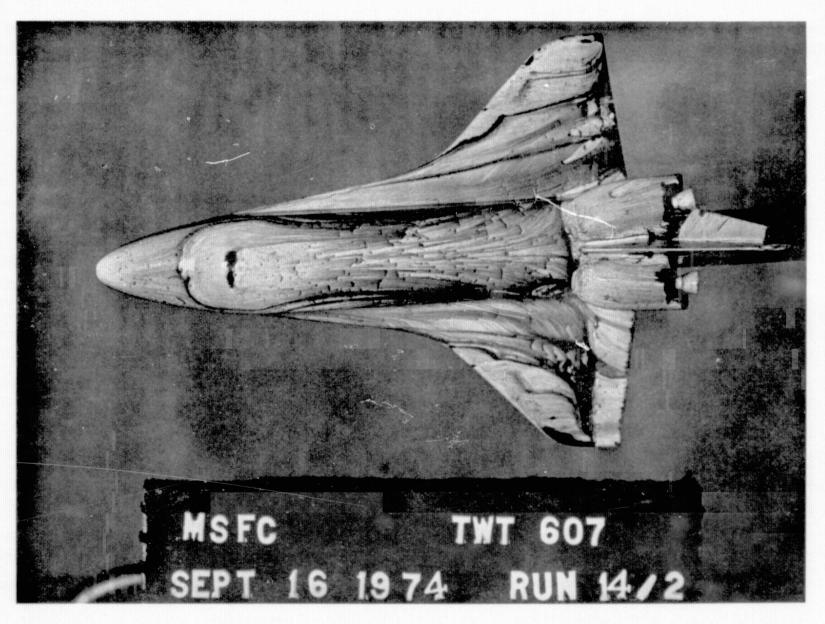


a. Right side view

Figure 79. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 10° MACH = 0.6

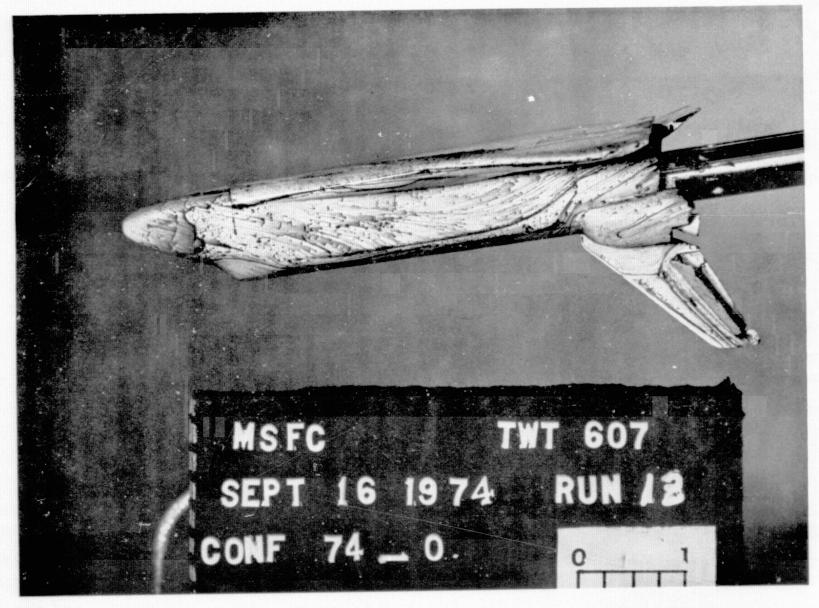


b. Left side viewFigure 79. - Continued.



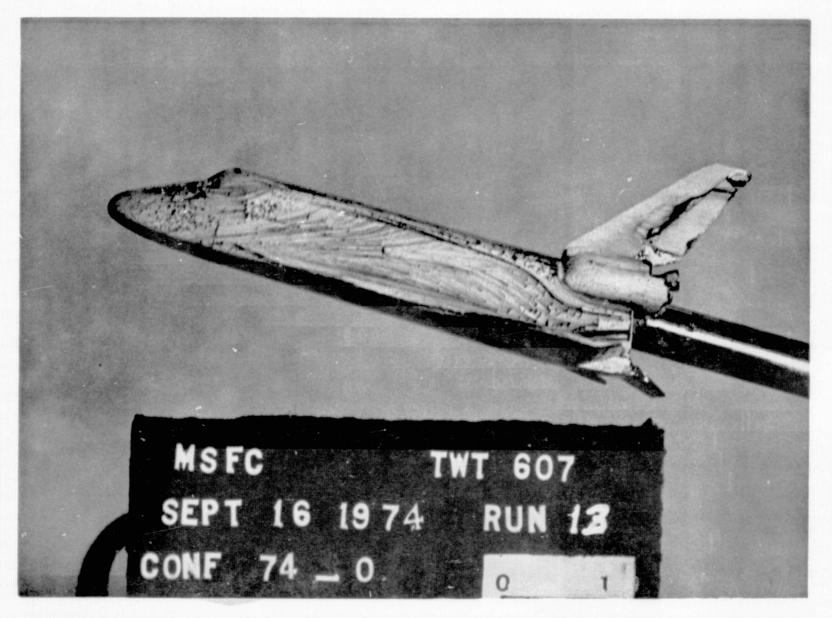
c. Top view

Figure 79. - Concluded.



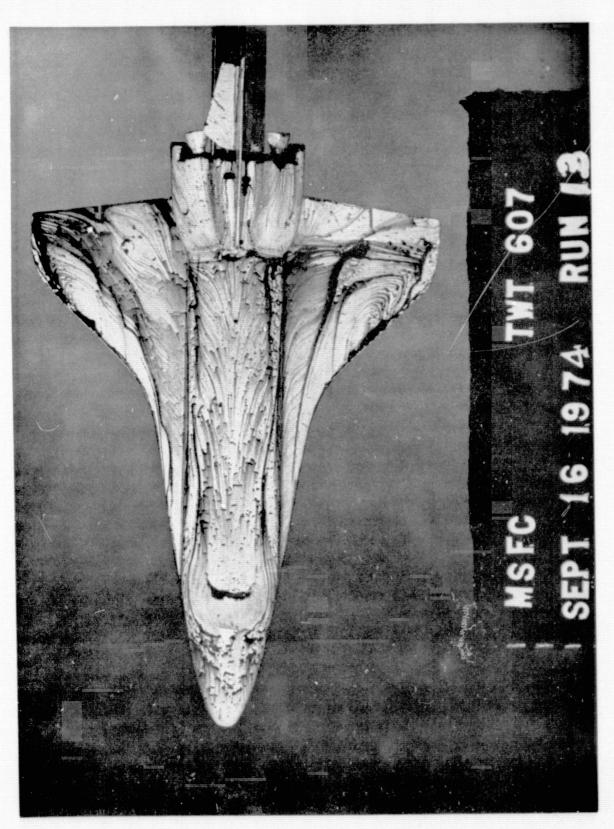
a. Right side view

Figure 80. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 15 MACH = 0.6



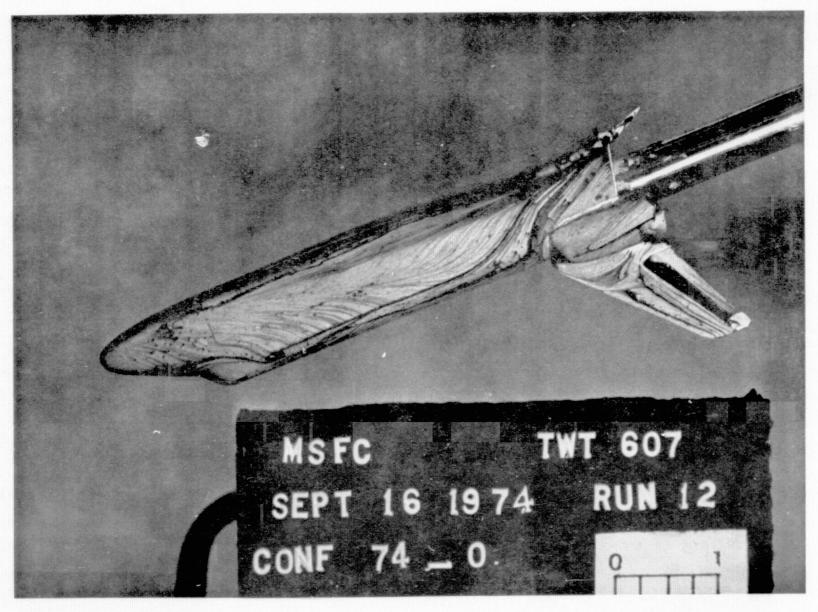
b. Left side view

Figure 80. - Continued.



c. Top view

Figure 80. - Concluded.



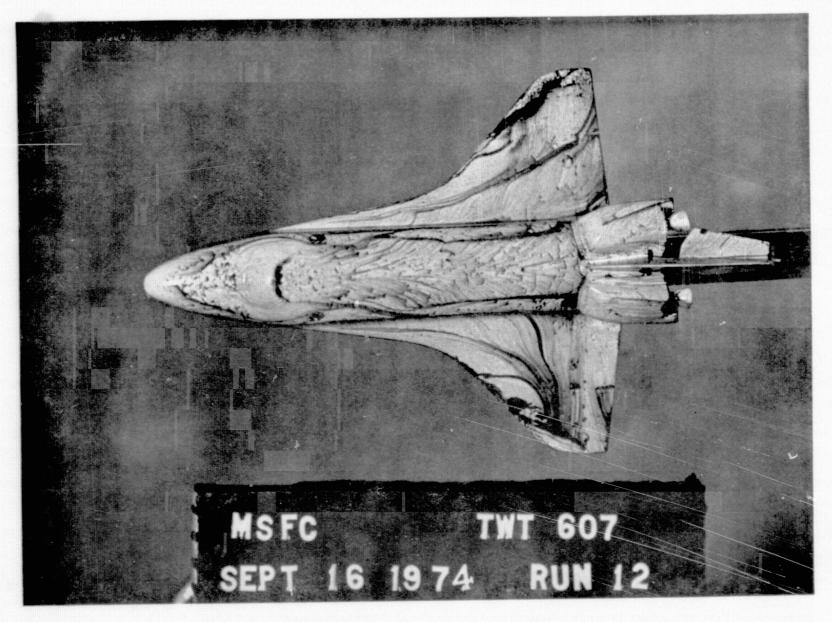
a. Right side view

Figure 81. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 20° MACH = 0.6



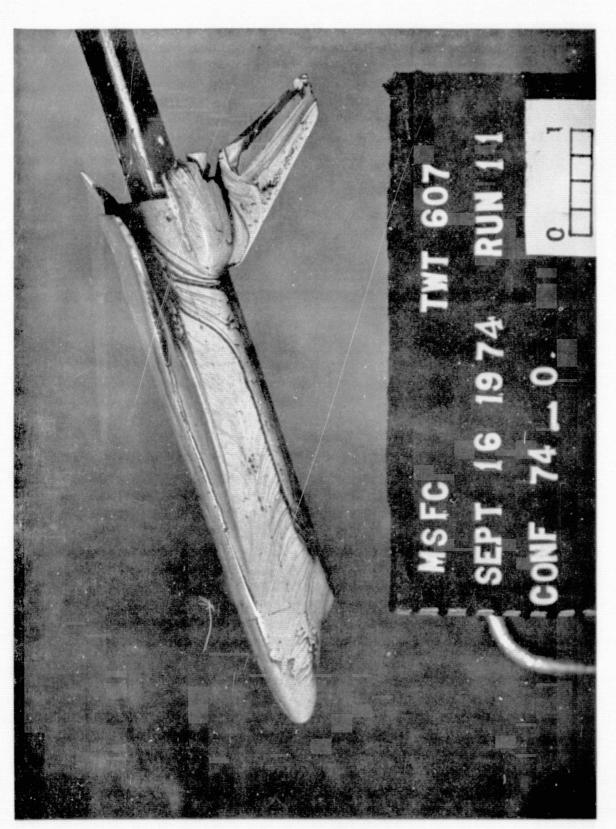
b. Left side view

Figure 81. - Continued.



c. Top view

Figure 81. - Concluded.



a. Right side view

Figure 82. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 MACH = 0.6ALPHA = 25°

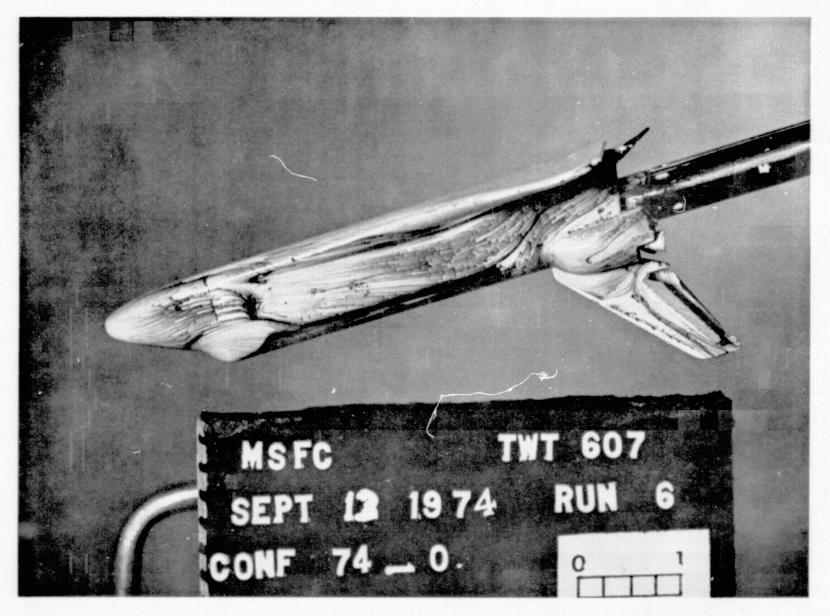


b. Left side view

Figure 82. - Continued.

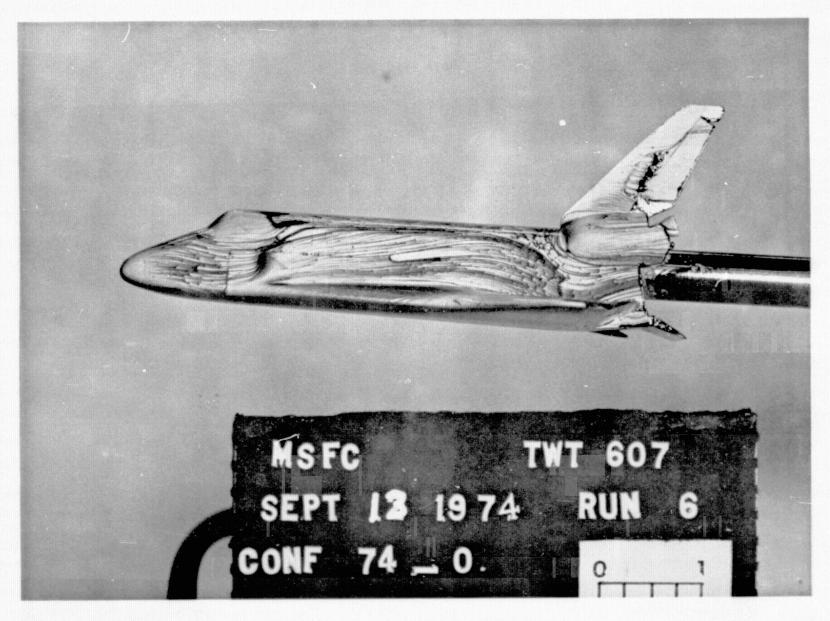


Figure 82. - Concluded.

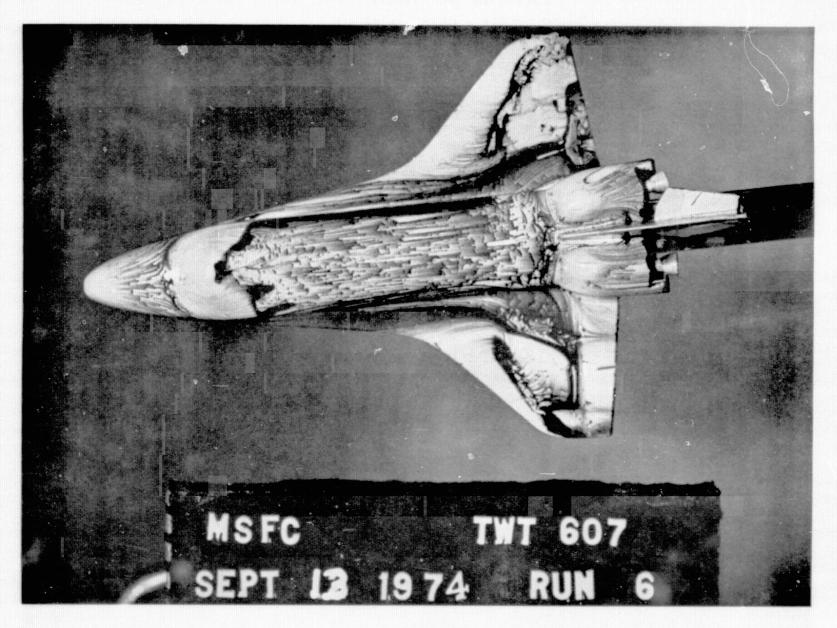


a. Right side view

Figure 83. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 5° MACH = 0.9

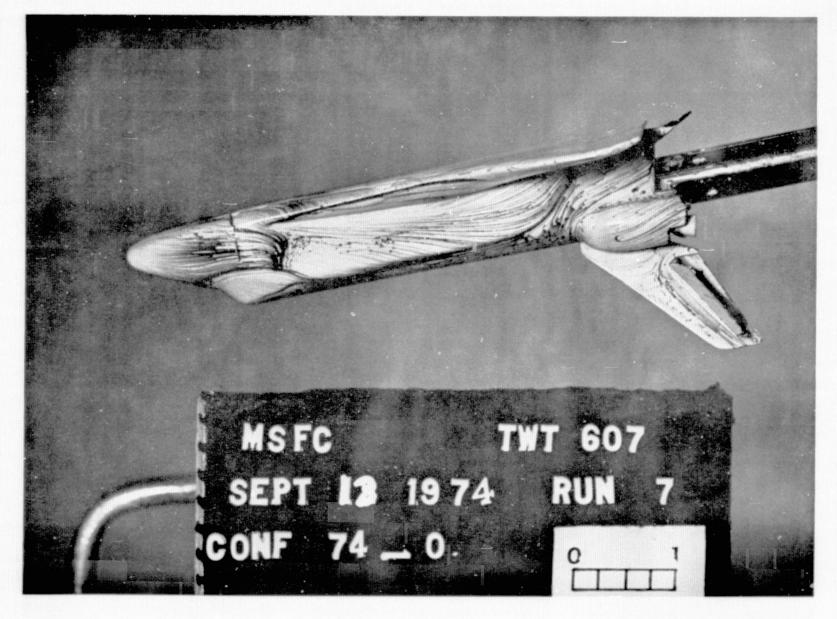


b. Left side viewFigure 83. - Continued.



c. Top view

Figure 83. - Concluded.



a. Right side view

Figure 84. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 10° MACH = 0.9

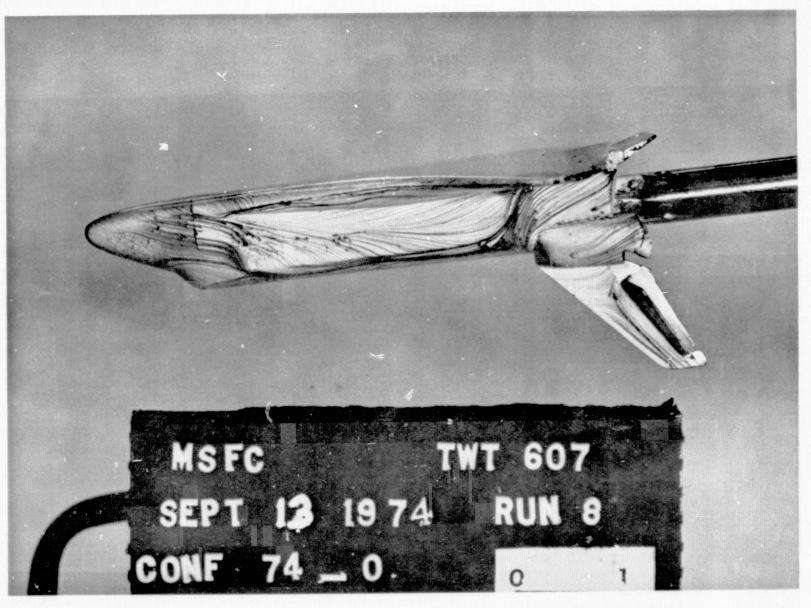


b. Left side view

Figure 84. - Continued.



Figure 84. - Concluded.



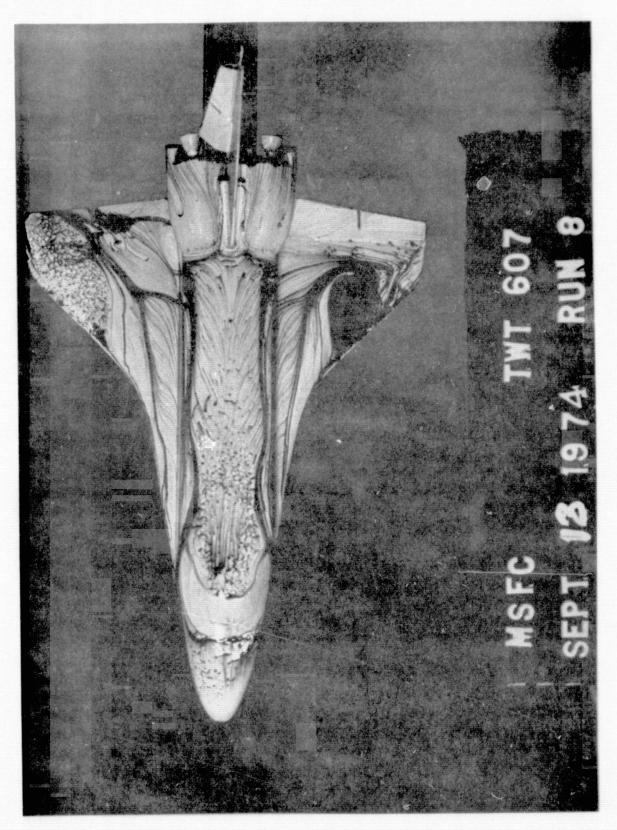
a. Right side view

Figure 85. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 15° MACH = 0.9



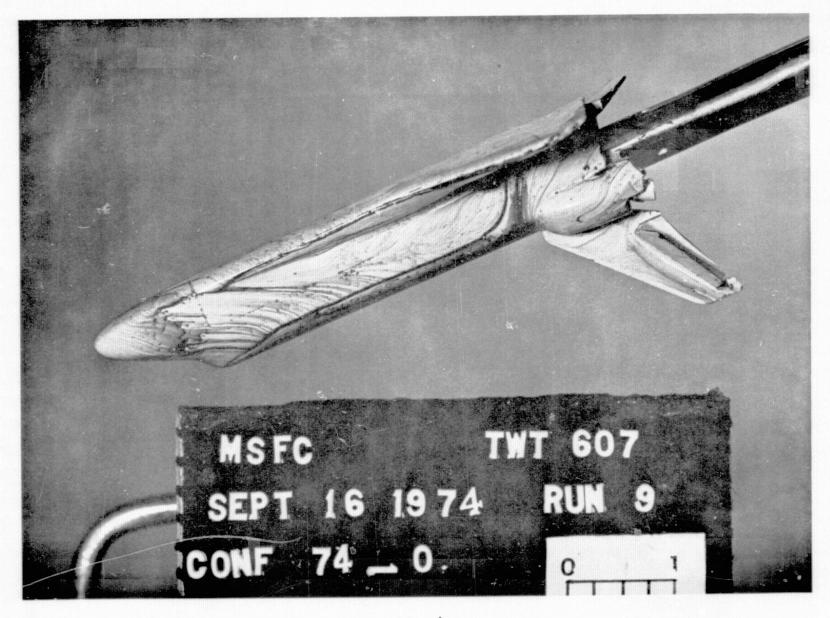
p. Left side view

Figure 85. - Continued.



c. Top view

Figure 85. - Concluded.



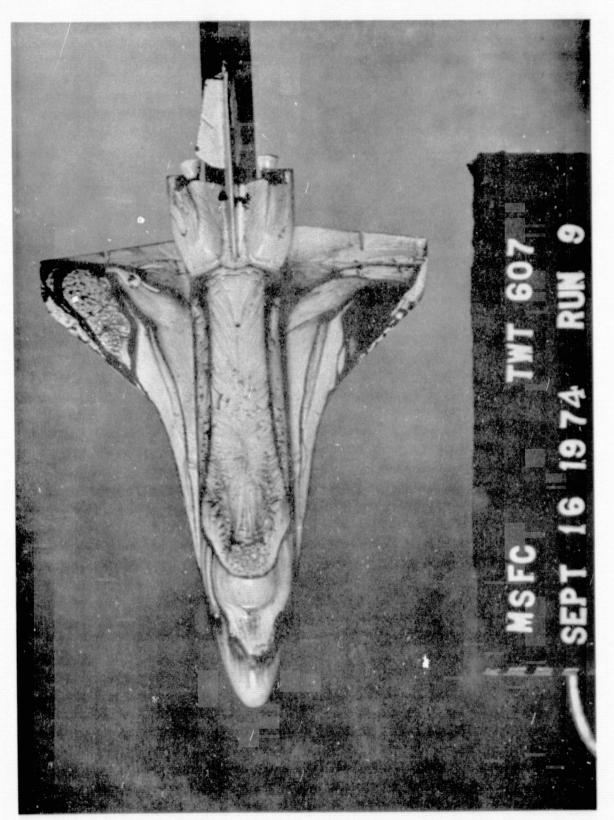
a. Right side view

Figure 86. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 20° MACH = 0.9



b. Left side view

Figure 86. - Continued.



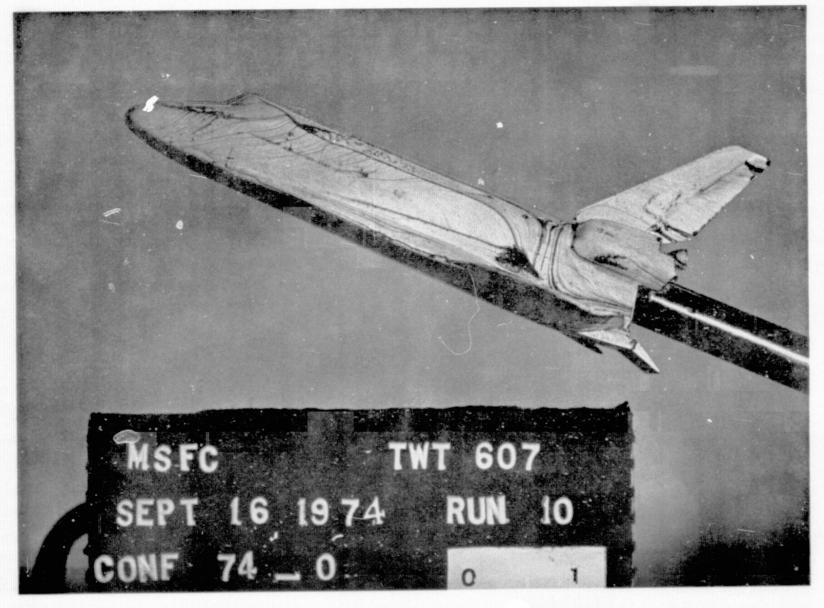
c. Top view

Figure 86. - Concluded.



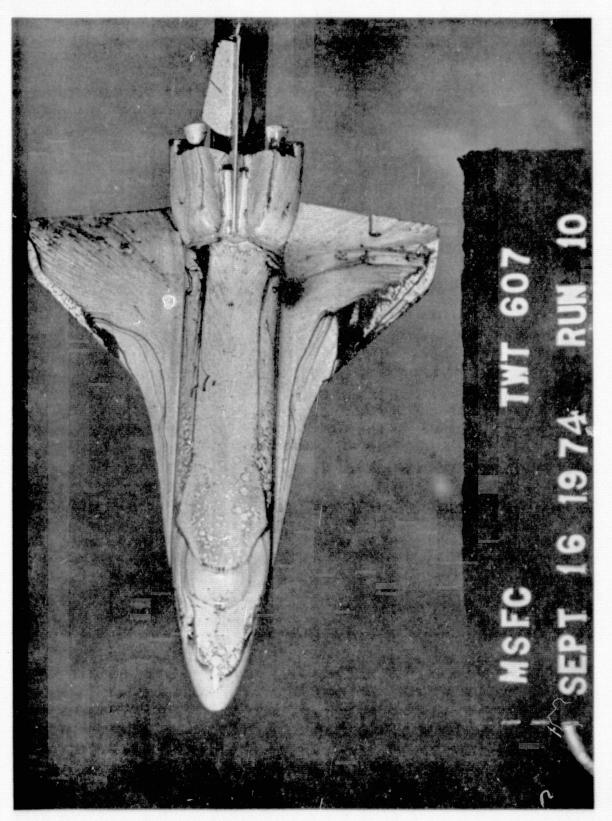
a. Right side view

Figure 87. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 25° MACH = 0.9



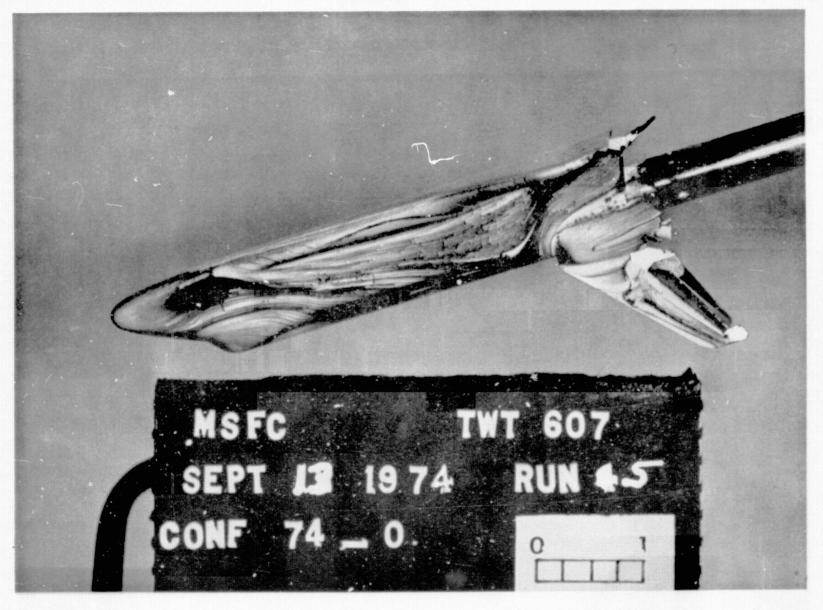
b. Left side view

Figure 87. - Continued.



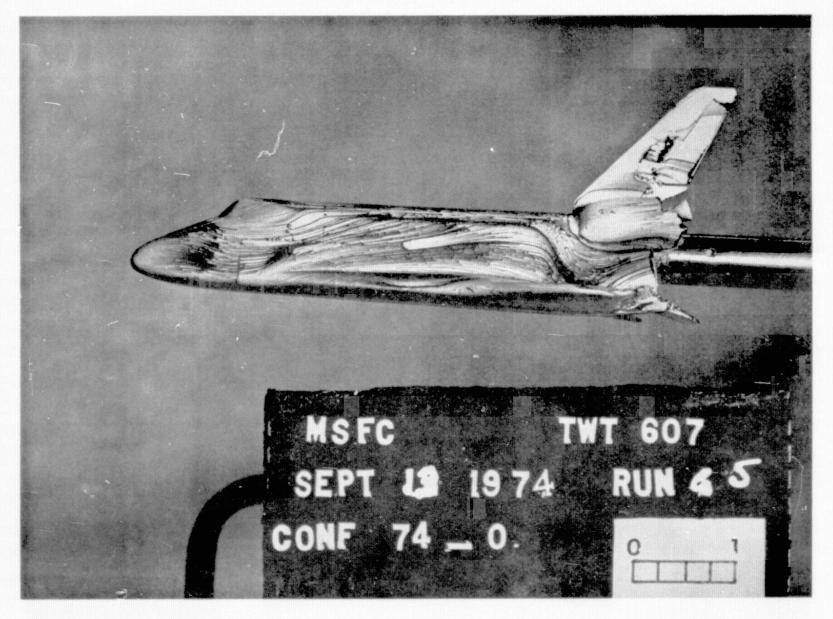
c. Top view

Figure 87. - Concluded.



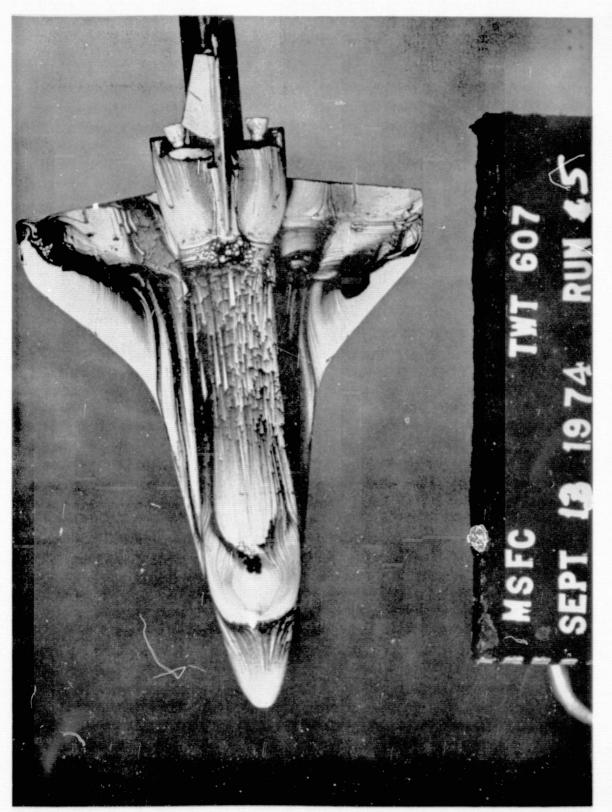
a. Right side view

Figure 88. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 5° MACH = 1.10



b. Left side view

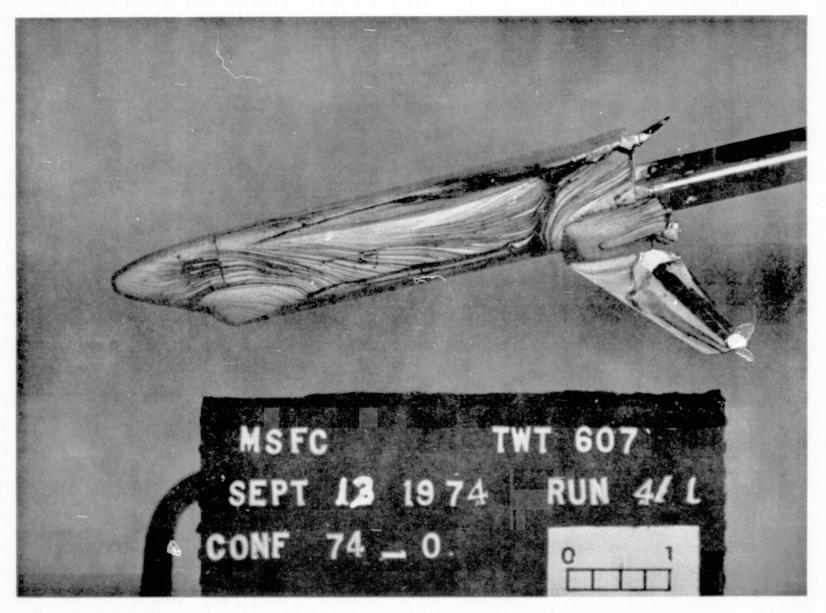
Figure 88. - Continued.



c. Top view

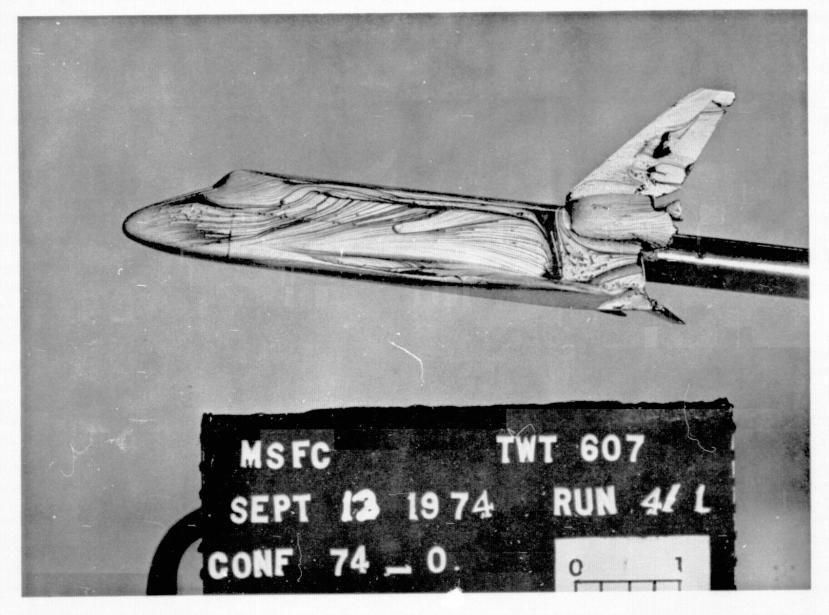
Figure 88. - Concluded.

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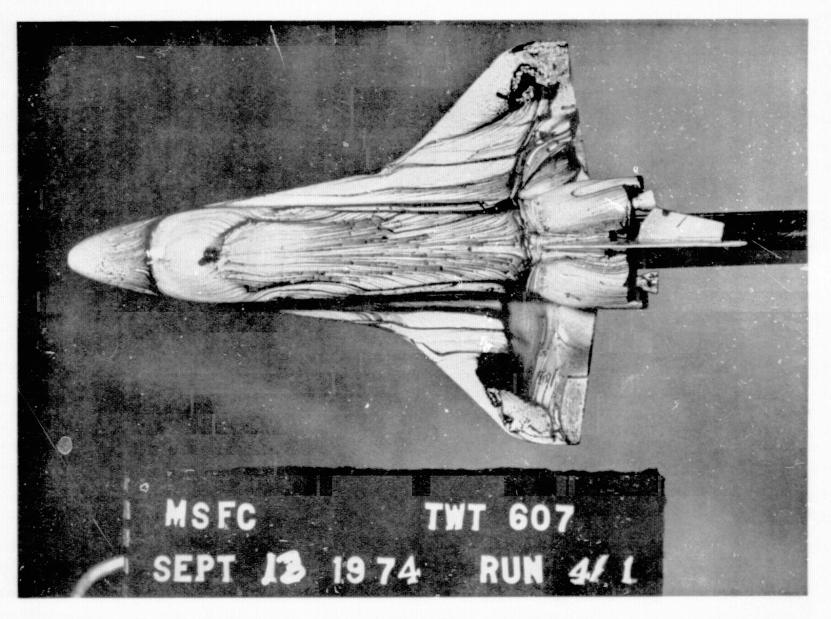
a. Right side view

Figure 89. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 10 MACH = 1.10



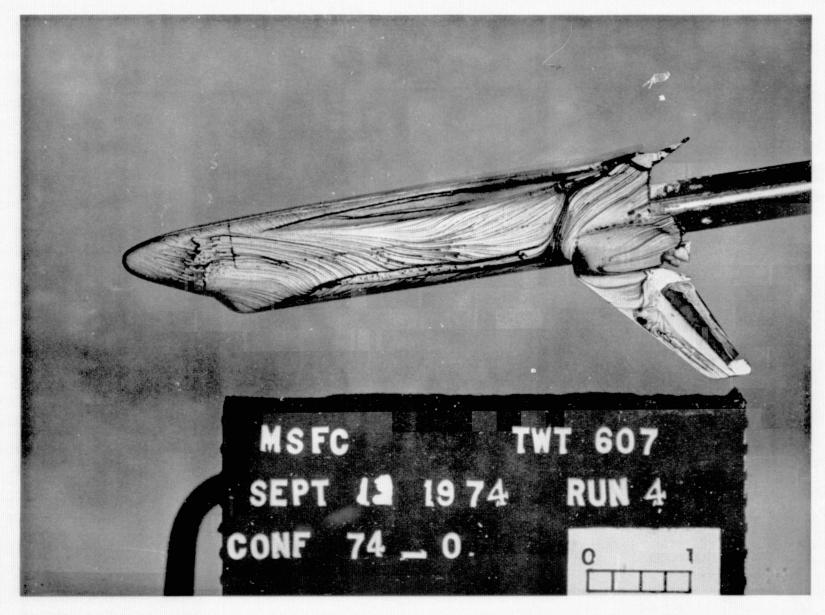
b. Left side view

Figure 89. - Continued.



c. Top view

Figure 89. - Concluded.



a. Right side view

Figure 90. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 10° MACH = 1.10



b. Left side viewFigure 90. - Continued.

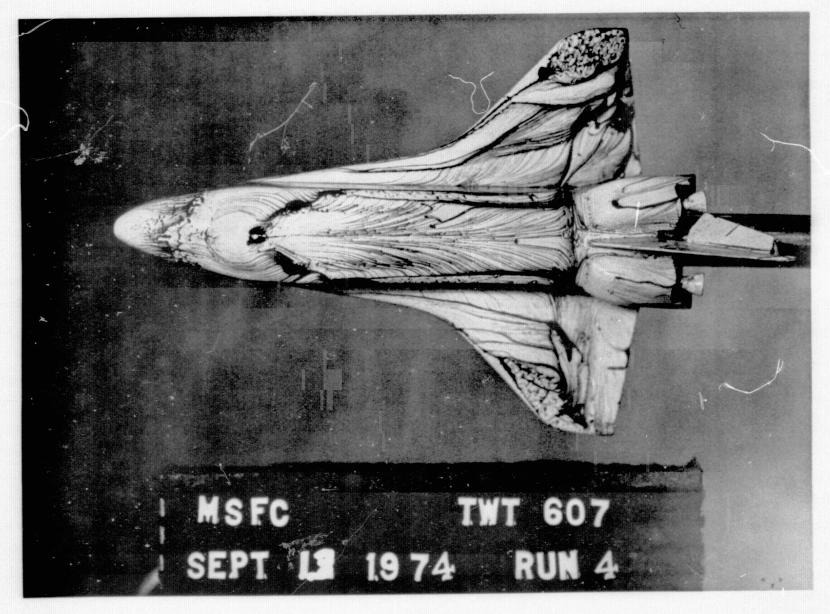
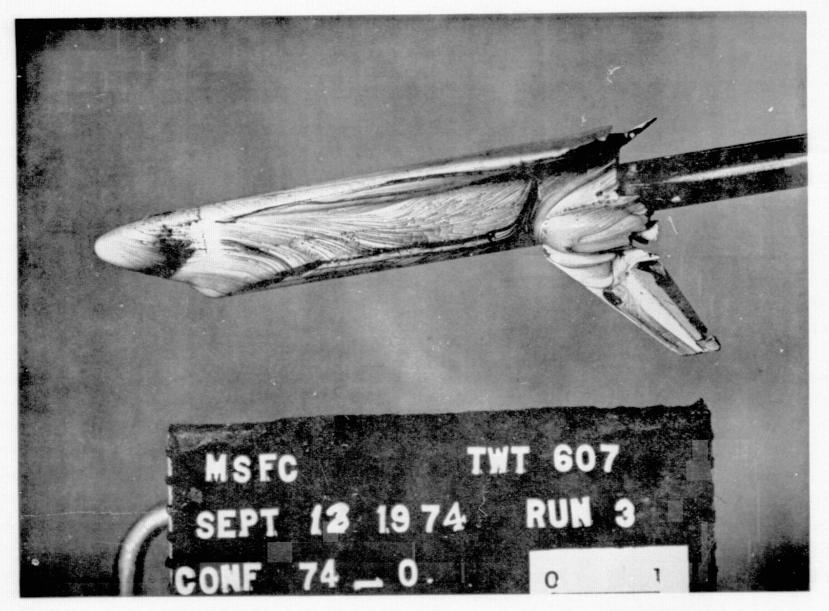


Figure 90. - Concluded.



a. Right side view

Figure 91. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 15° MACH = 1.10

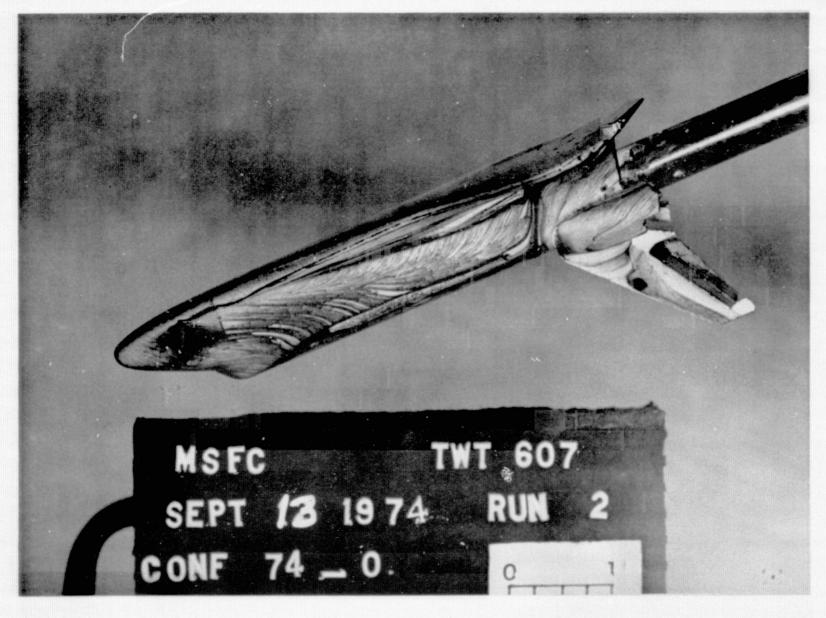


b. Left side view

Figure 91. - Continued.

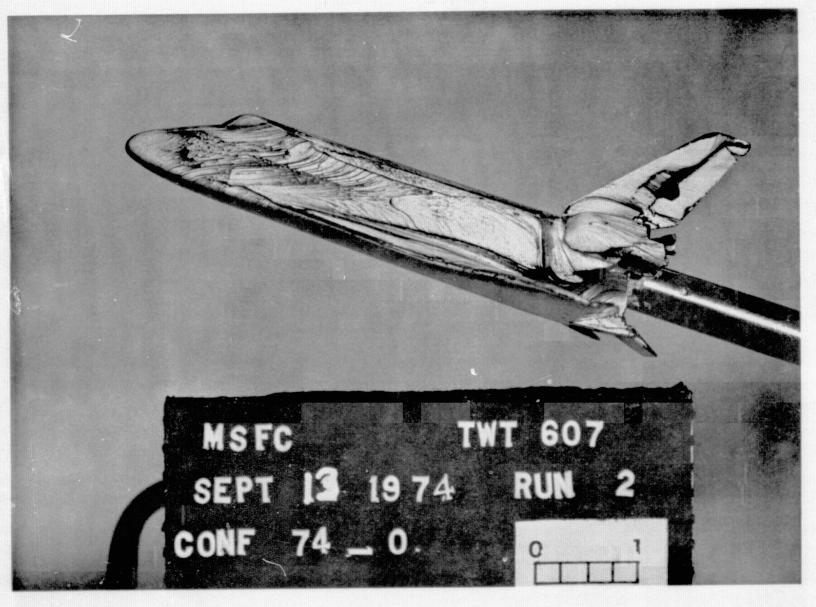


Figure 91. - Concluded.



a. Right side view

Figure 92. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 20° MACH = 1.10



b. Left side viewFigure 92. - Continued.



Figure 92. - Concluded.



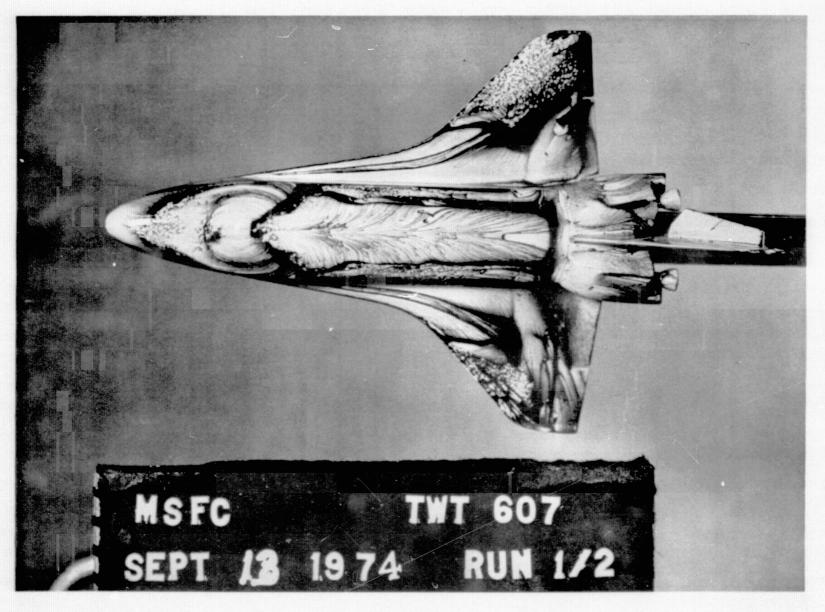
a. Right side view

Figure 93. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 25° MACH = 1.10



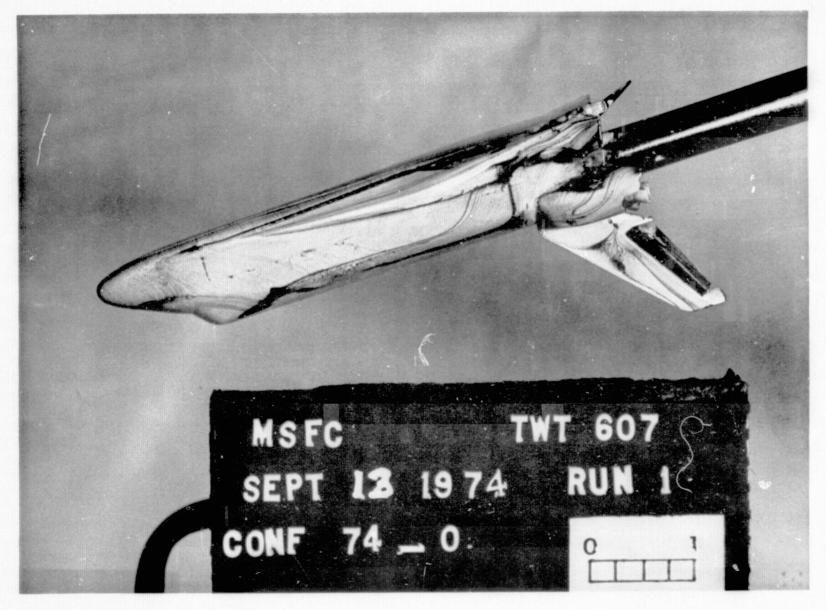
b. Left side view

Figure 93. - Continued.



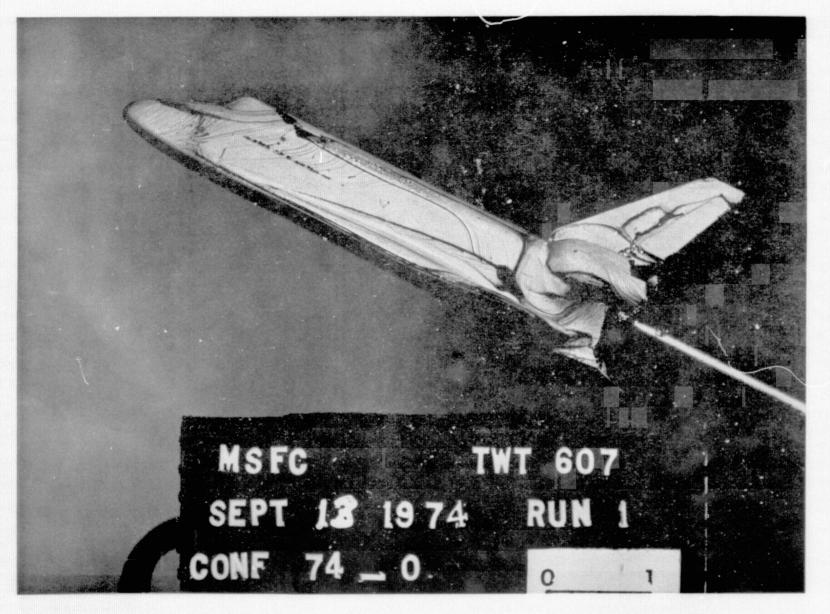
c. Top view

Figure 93. - Concluded.



a. Right side view

Figure 94. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 25° MACH = 1.10



b. Left side view

Figure 94. - Continued.

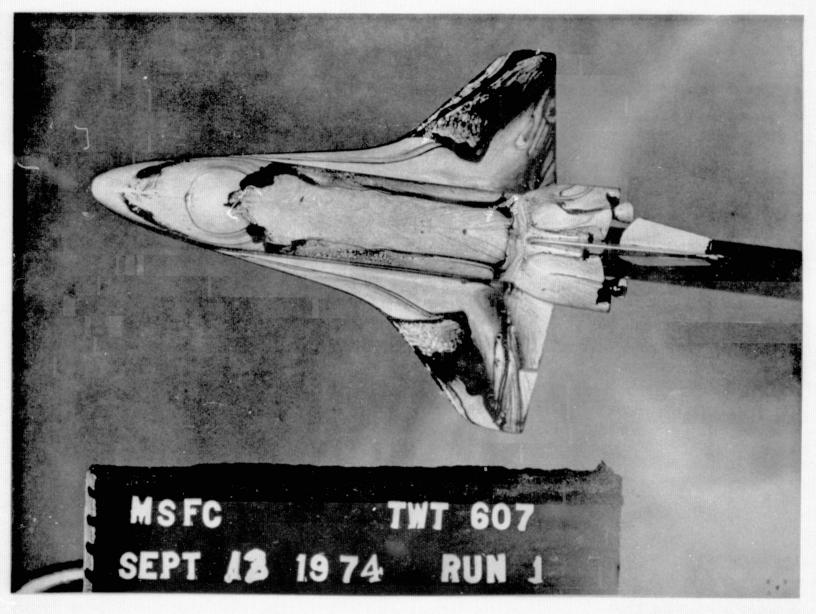
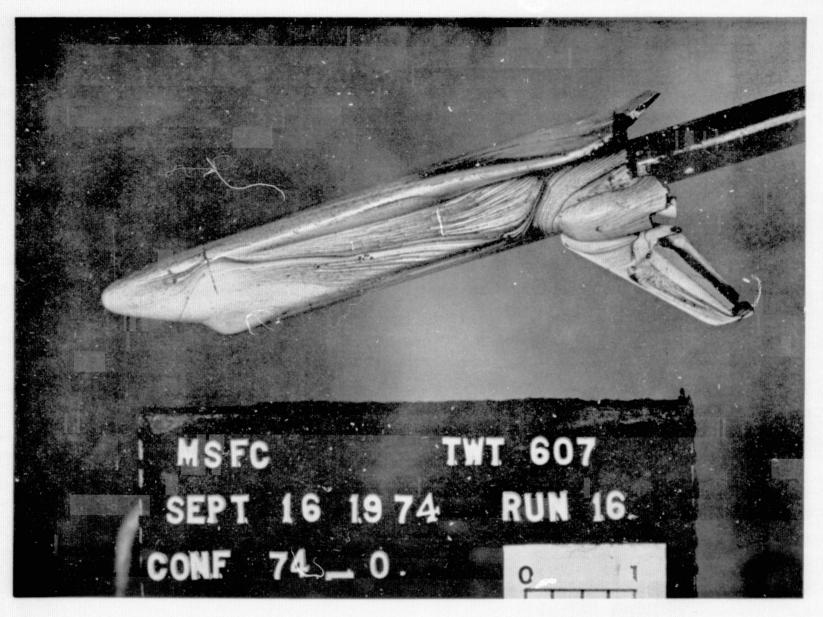
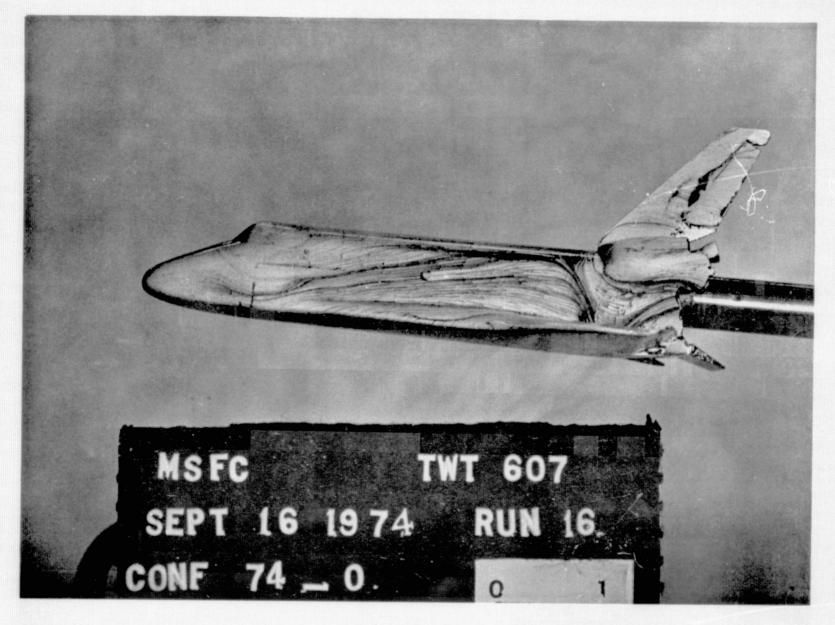


Figure 94. - Concluded.



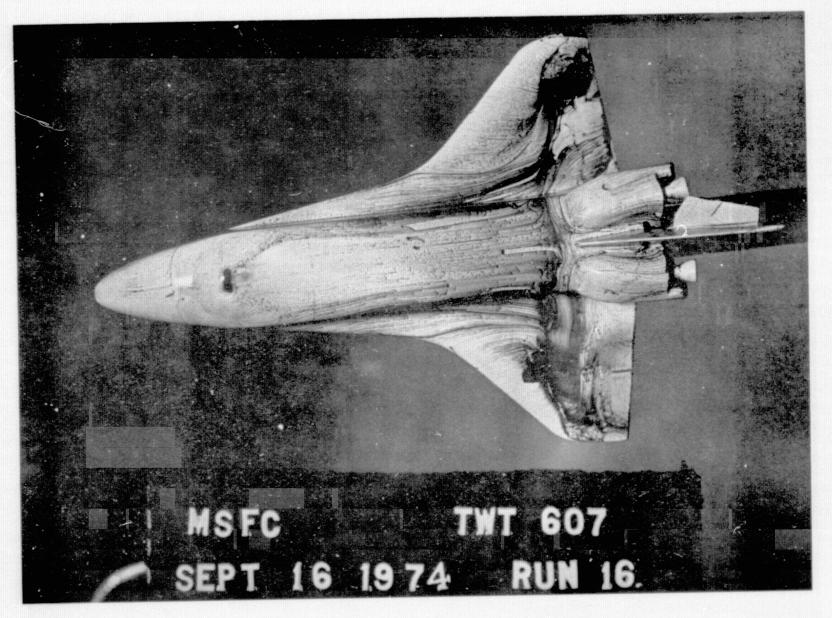
a. Right side view

Figure 95. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 5° MACH = 1.25



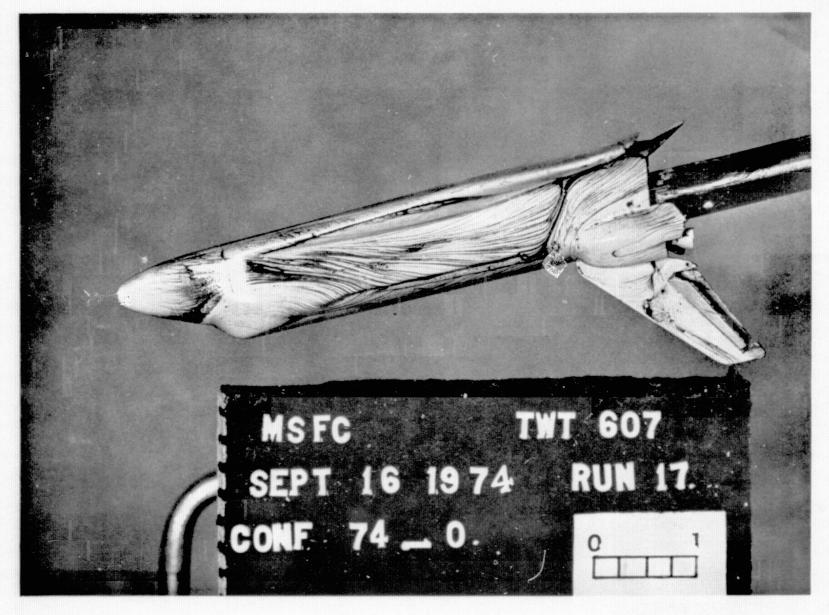
b. Left side view

Figure 95. - Continued.



c. Top view

Figure 95. - Concluded.



a. Right side view

Figure 96. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 10° MACH = 1.25



b. Left side viewFigure 96. - Continued.

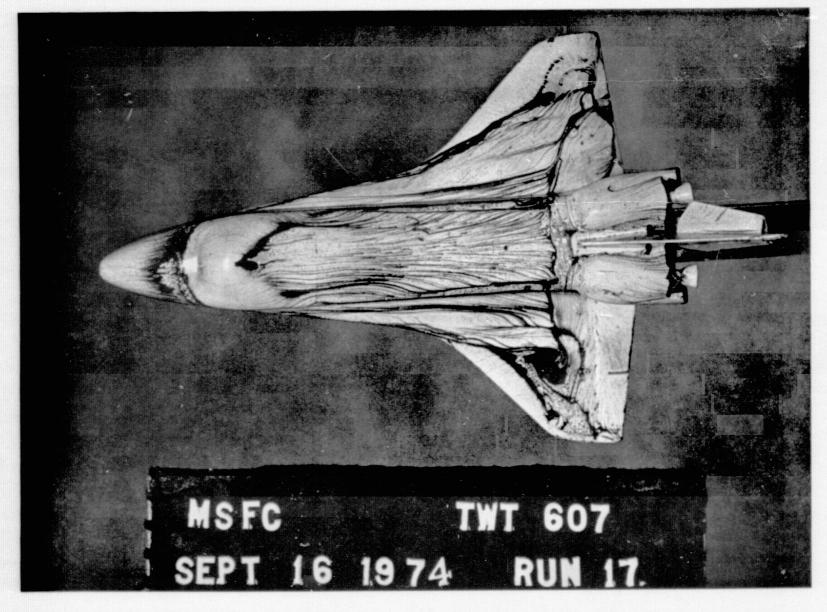
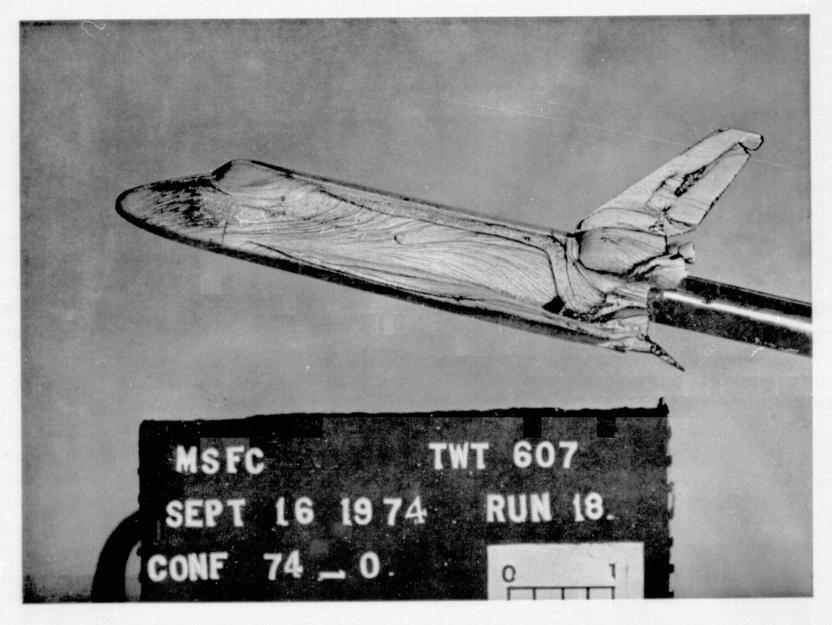


Figure 96. - Concluded.



a. Right side view

Figure 97. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 15° MACH = 1.25



b. Left side view

Figure 97. - Continued.

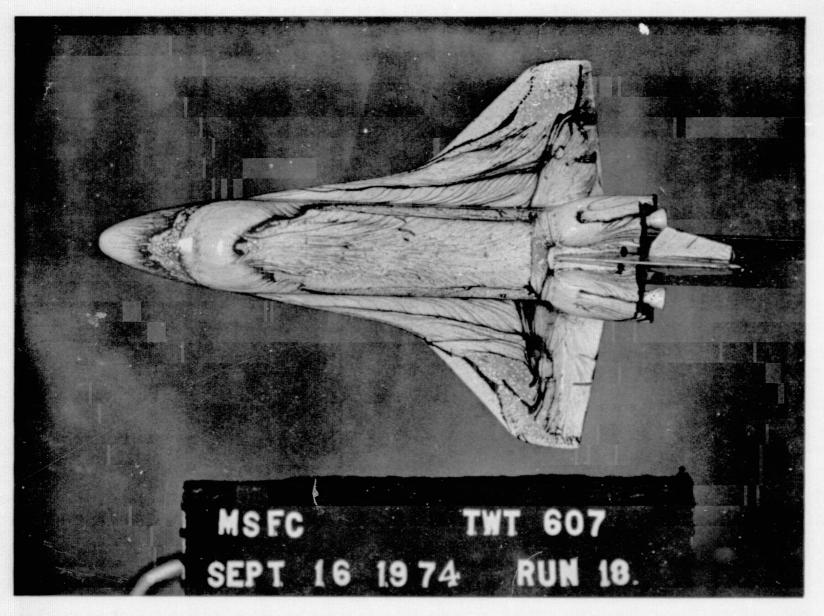
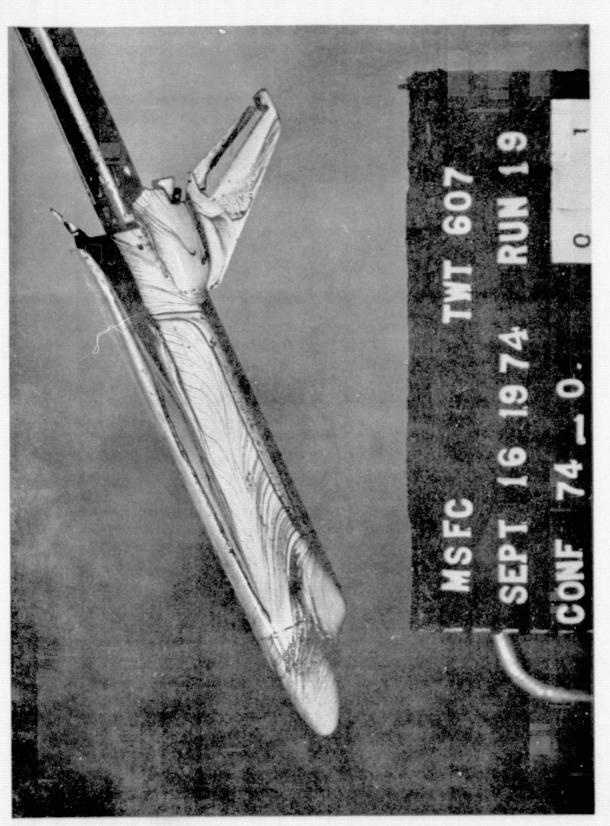
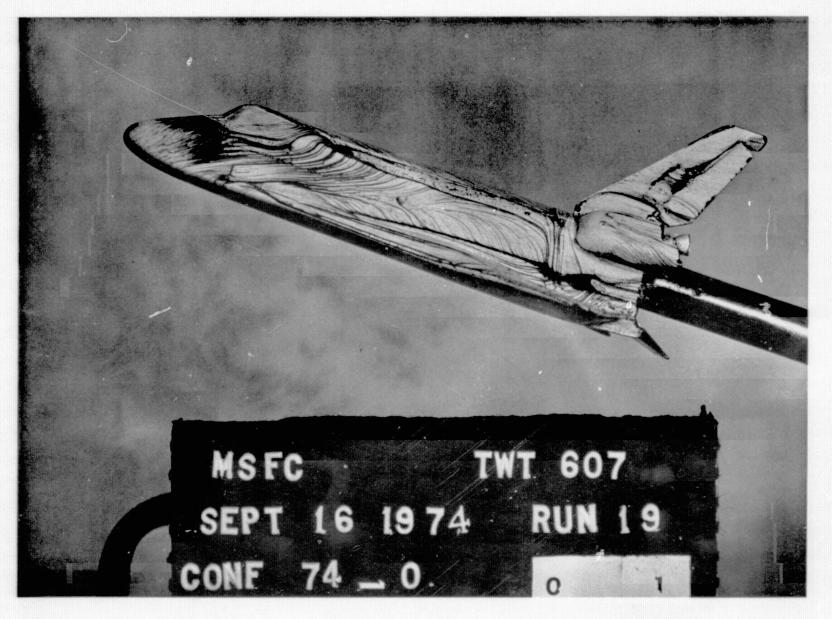


Figure 97. - Concluded.



a. Right side view

Figure 98. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 20° MACH = 1.25



b. Left side view

Figure 98. - Continued.

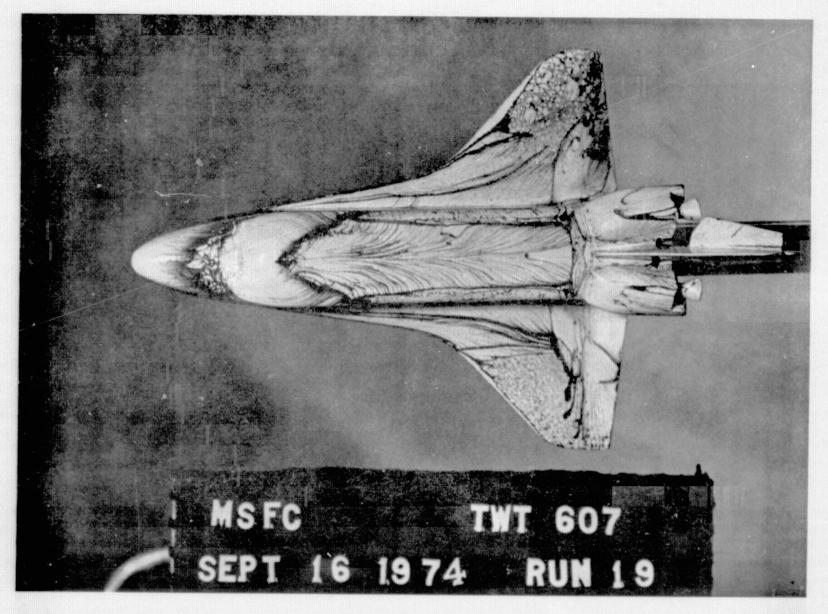
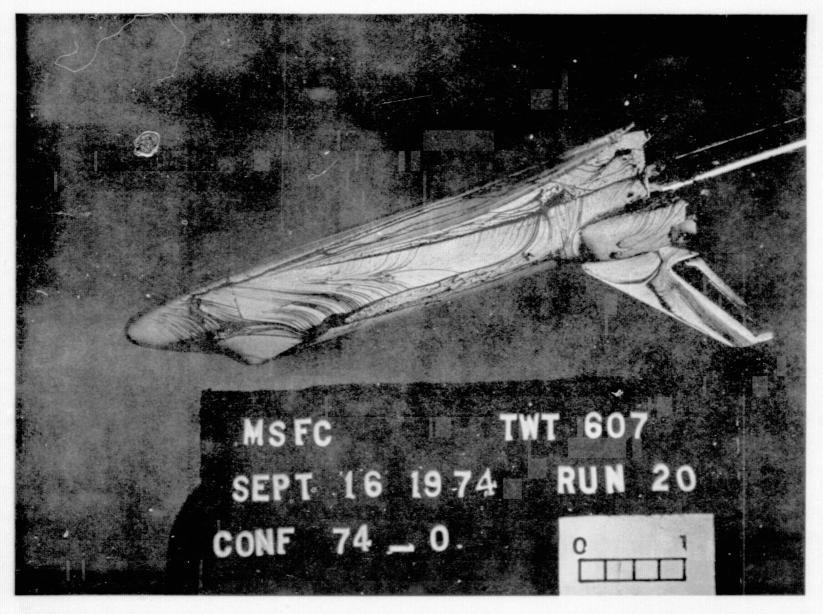


Figure 98. - Concluded.



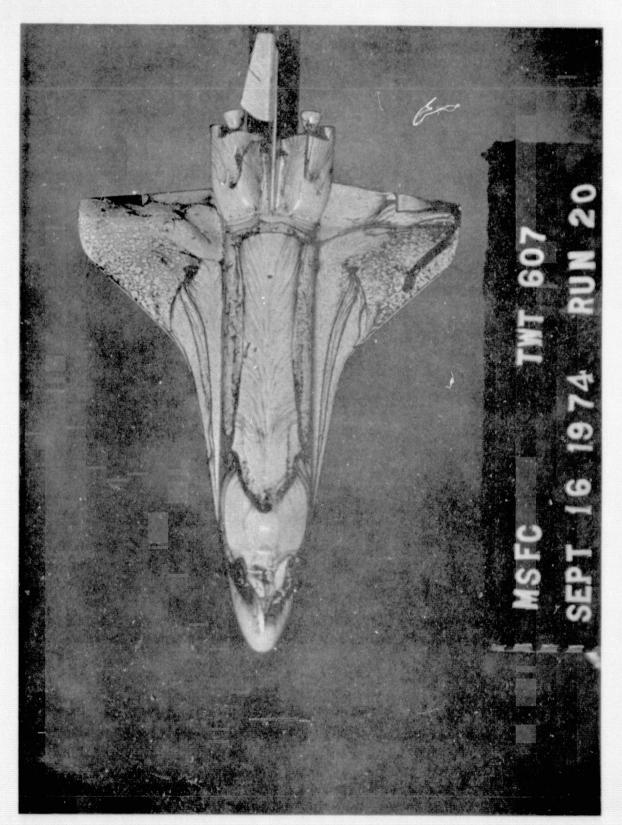
a. Right side view

Figure 99. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 25° MACH = 1.25



b. Left side view

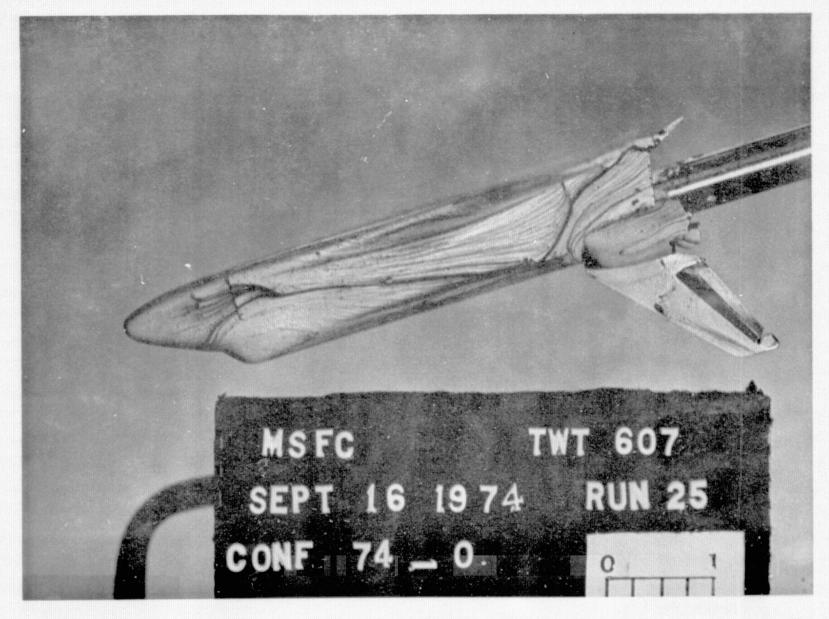
Figure 99. - Continued.



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c. Top view

Figure 99. - Concluded.

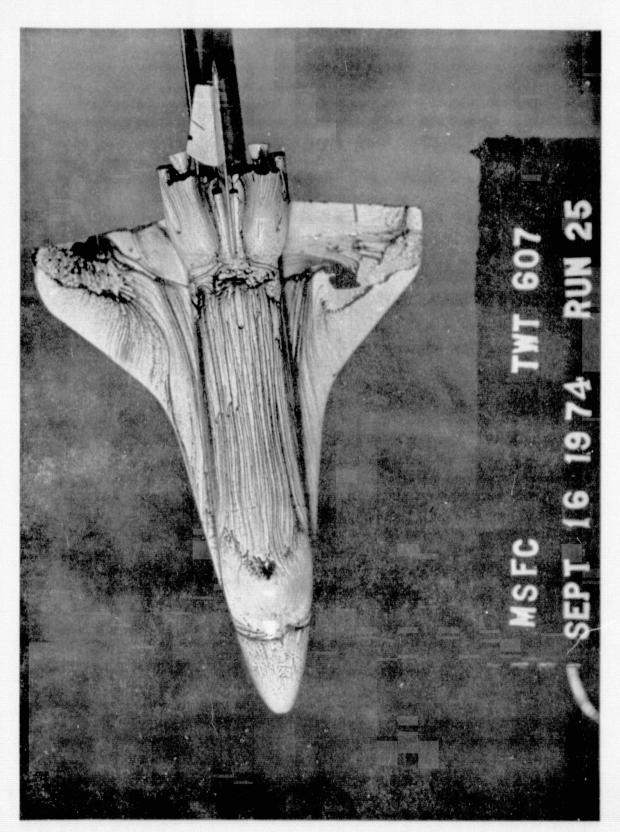


a. Right side view Figure 100. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 5° MACH = 1.46



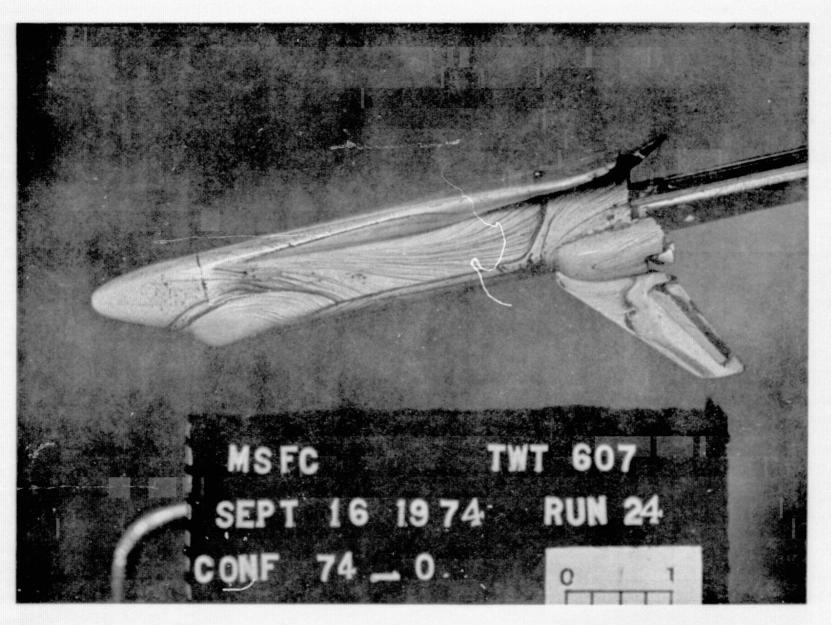
b. Left side view

Figure 100. - Continued.



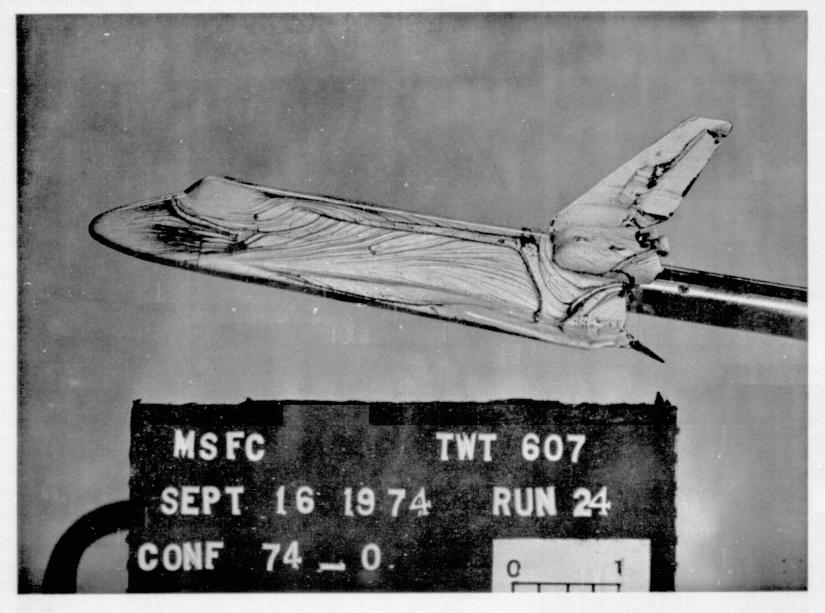
c. Top view

Figure 100. - Concluded.



a. Right side view

Figure 101. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 10° MACH = 1.46



b. Left side view

Figure 101. - Continued.

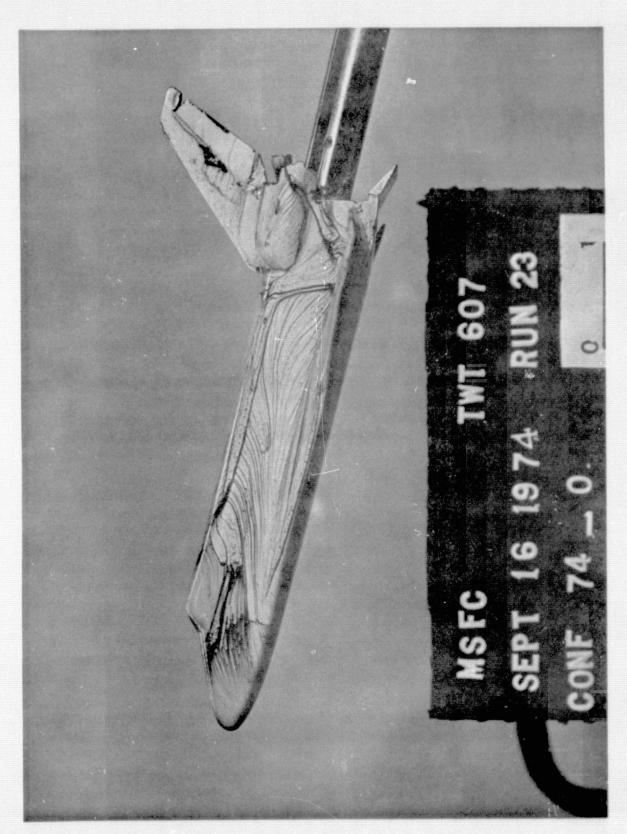


c. Top view Figure 101. - Concluded



a. Right side view

Figure 102. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 15° MACH = 1.46



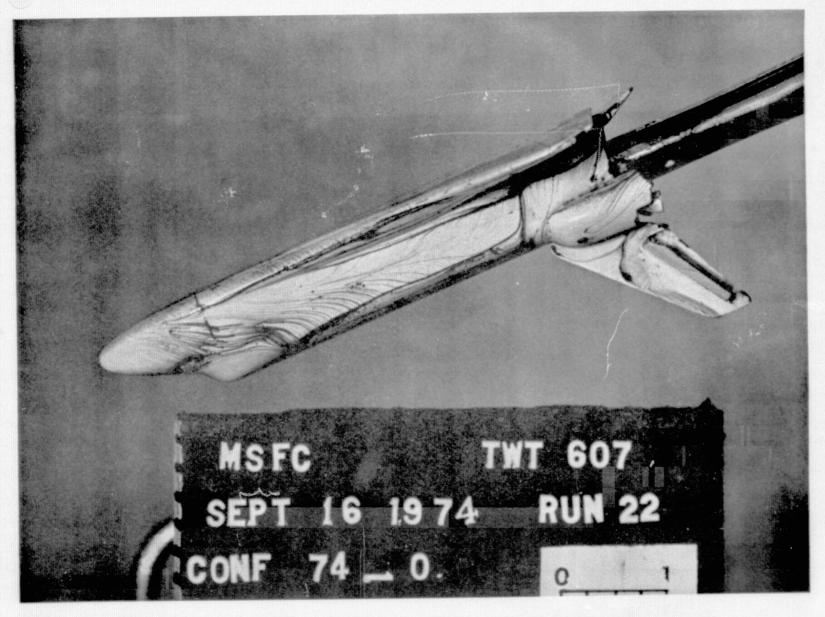
b. Left side view

Figure 102. - Continued.



c. Top view

Figure 102. - Concluded.



a. Right side view

Figure 103. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 20° MACH = 1.46



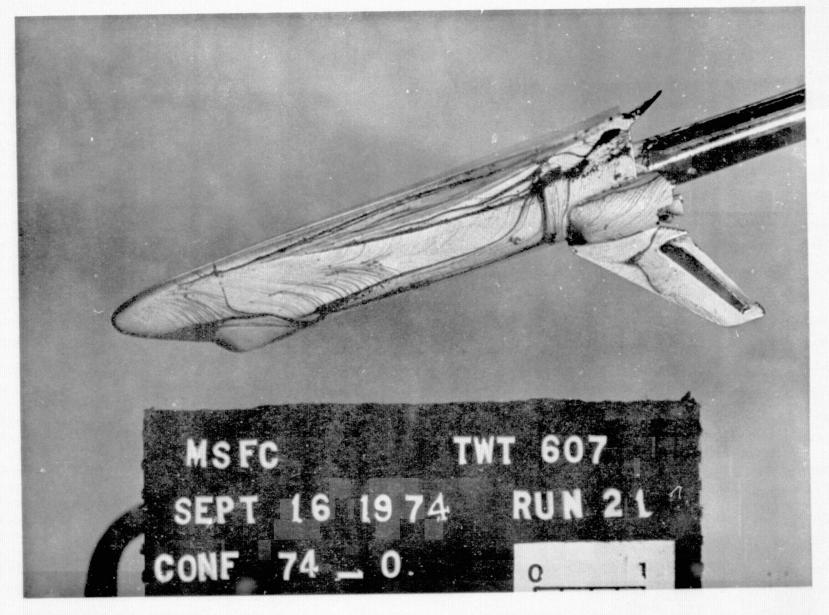
b. Left side view

Figure 103. - Continued.

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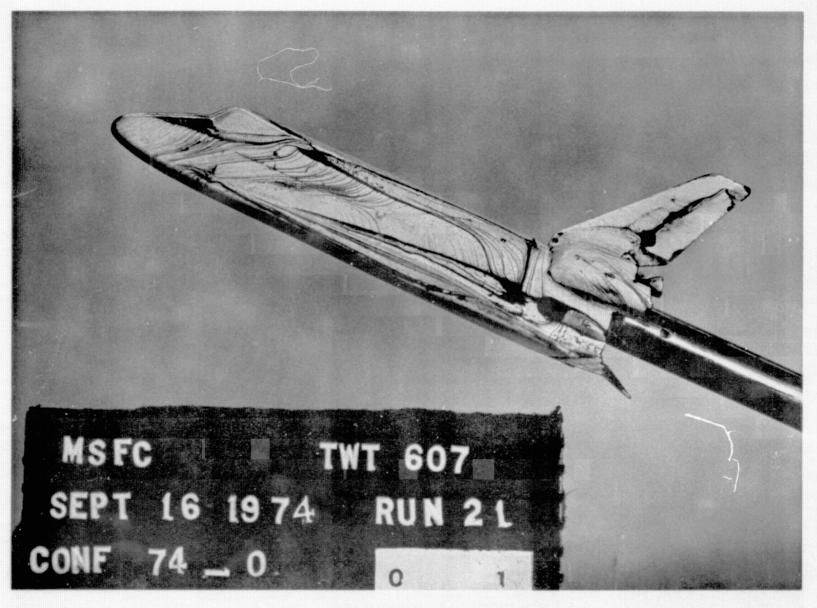
c. Top view

Figure 103. - Concluded.

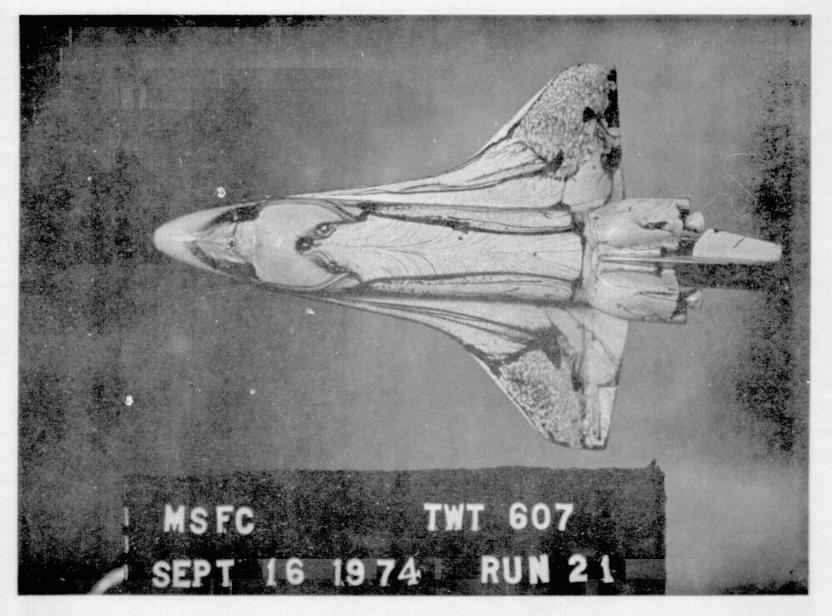


a. Right side view

Figure 104. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 25° MACH = 1.46



b. Left side viewFigure 104. - Continued.



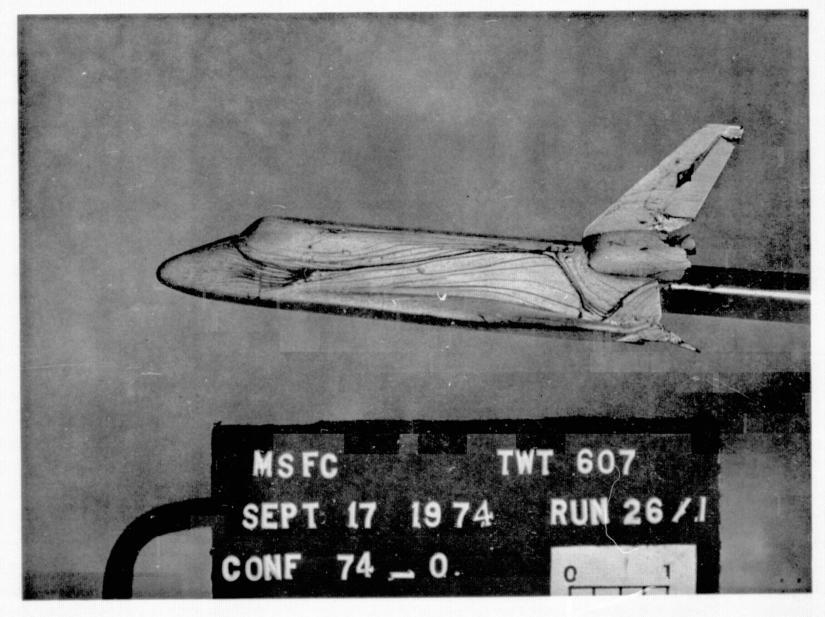
c. Top view

Figure 104. - Concluded.



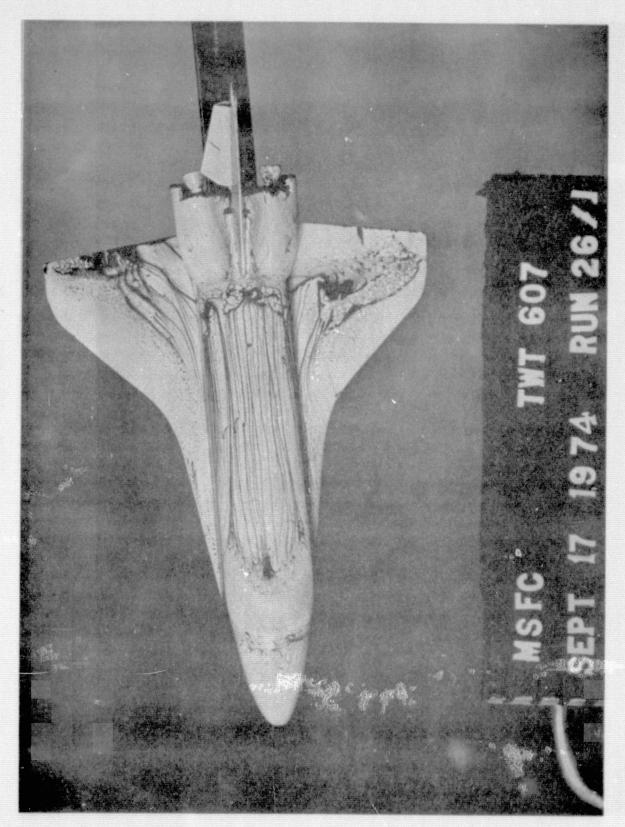
a. Right side view

Figure 105. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 5° MACH = 1.96



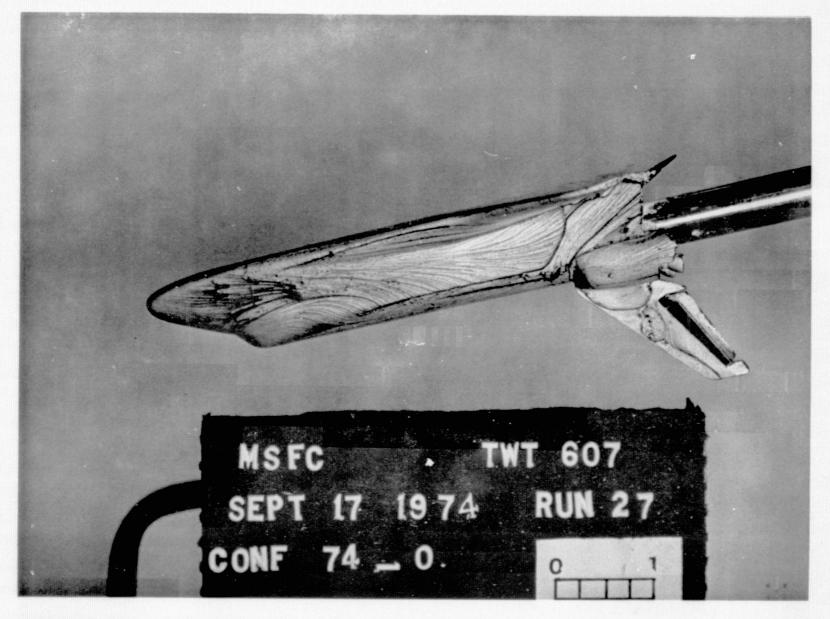
b. Left side view

Figure 105. - Continued.



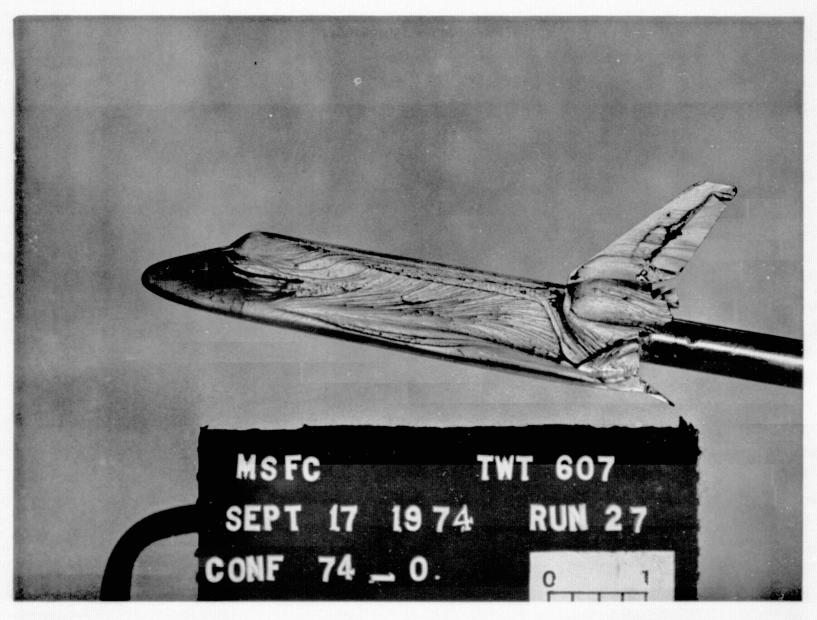
c. Top view

Figure 105. - Concluded.



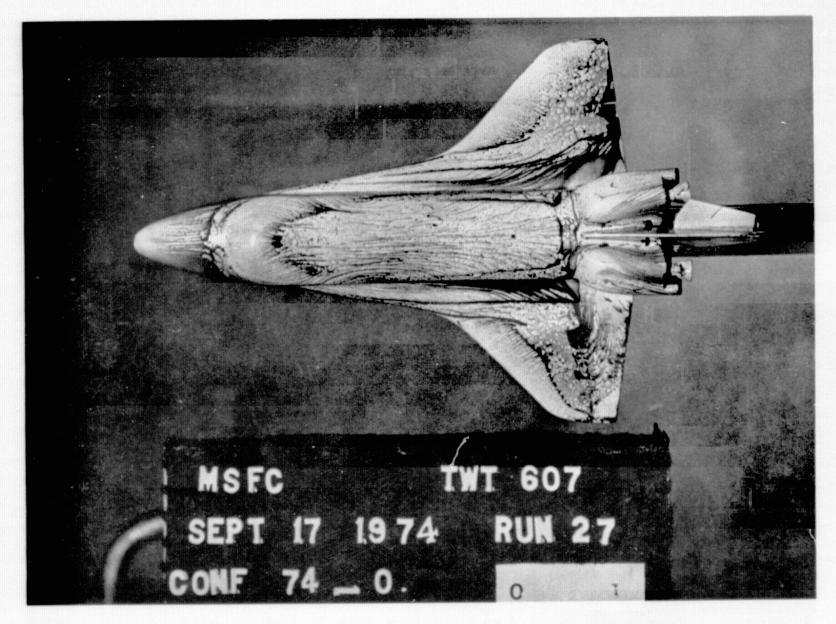
a. Right side view

Figure 106. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 10° MACH = 1.96



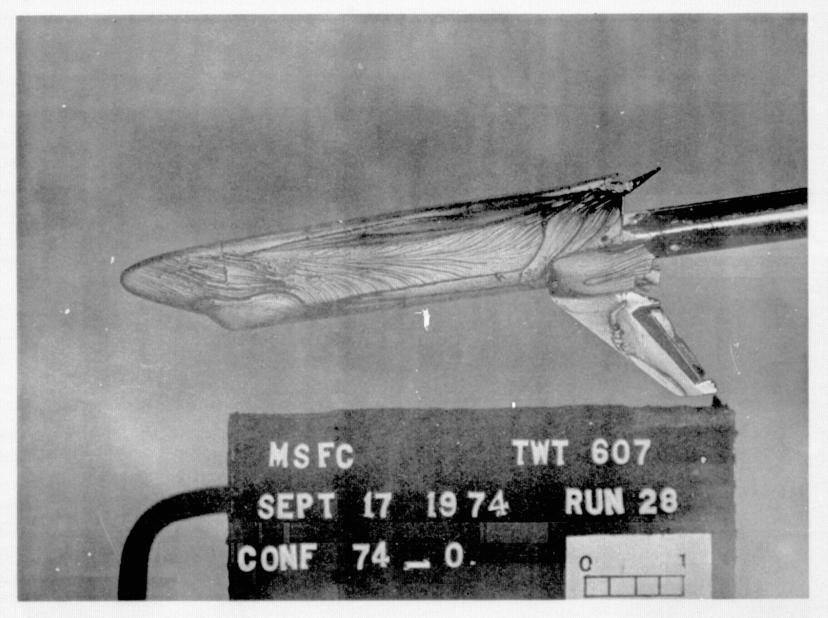
b. Left side view

Figure 106. - Continued.



c. Top view

Figure 106. - Concluded.



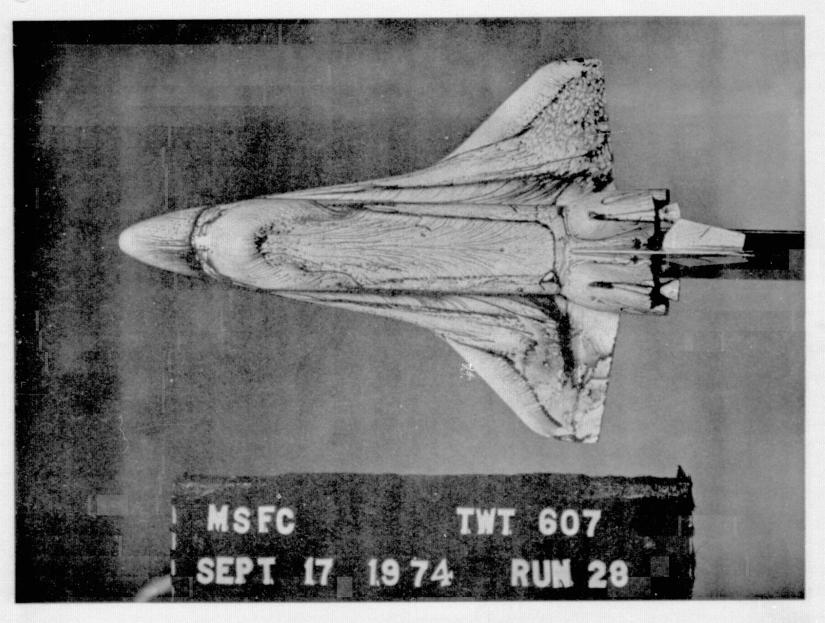
a. Right side view

Figure 107. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 15° MACH = 1.96



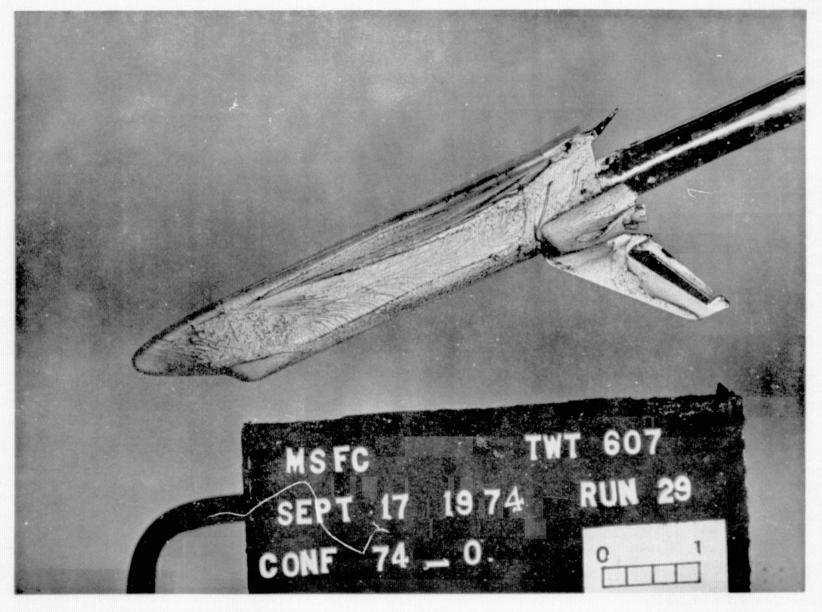
b. Left side view

Figure 107. - Continued.



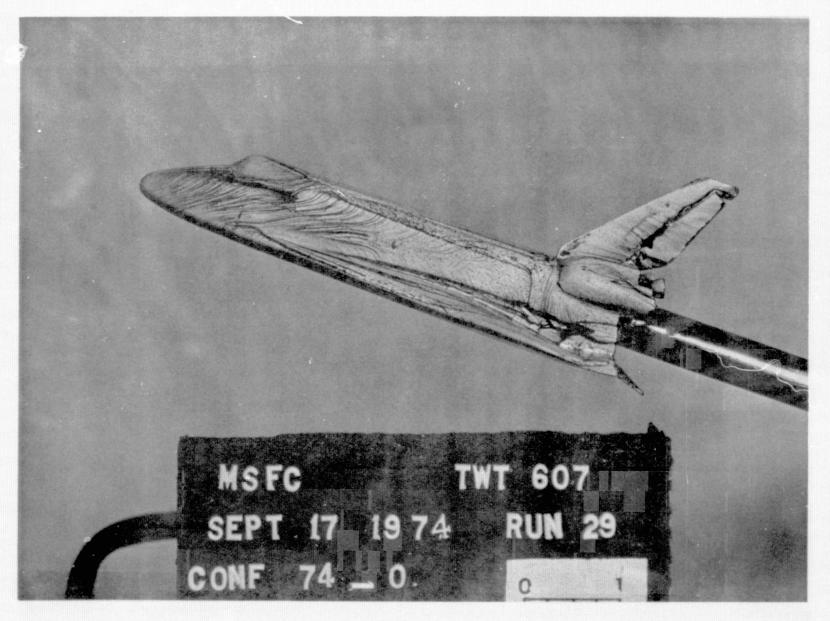
c. Top view

Figure 107. - Concluded.



a. Right side view

Figure 108. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 20° MACH = 1.96



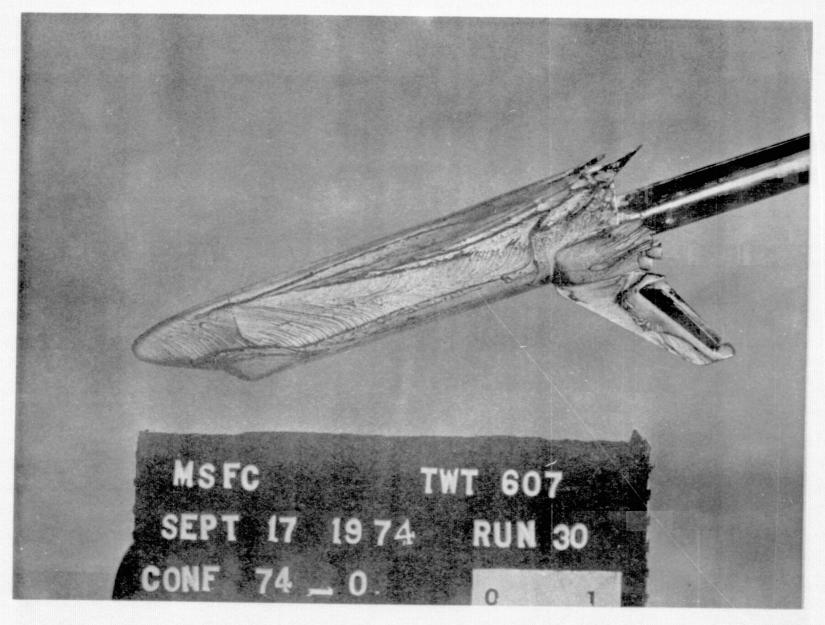
b. Left side view

Figure 108. - Continued.



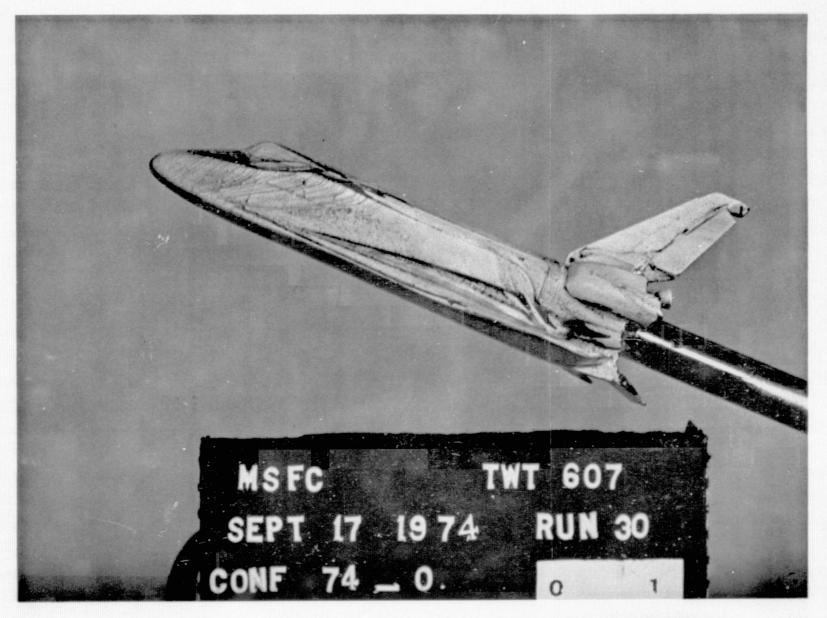
c. Top view

Figure 108. - Concluded.



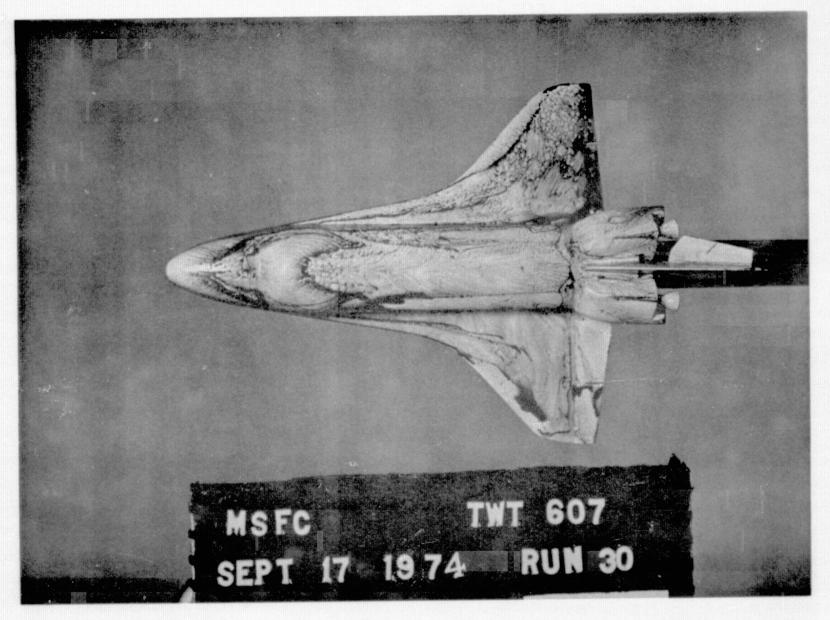
a. Right side view

Figure 109. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 25° MACH = 1.96



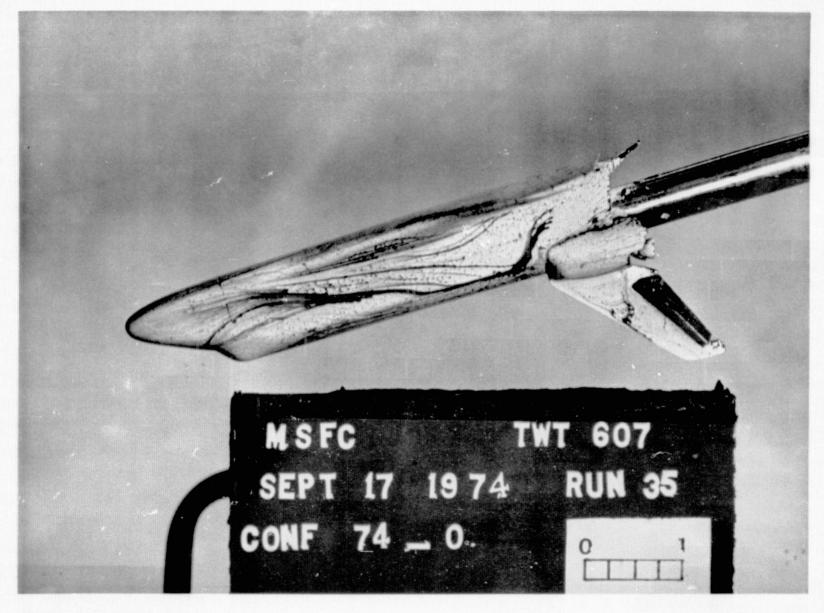
b. Left side view

Figure 109. - Continued.



c. Top view

Figure 109. - Concluded.



a. Right side view

Figure 110. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 5° MACH = 2.75



b. Left side view

Figure 110. - Continued.

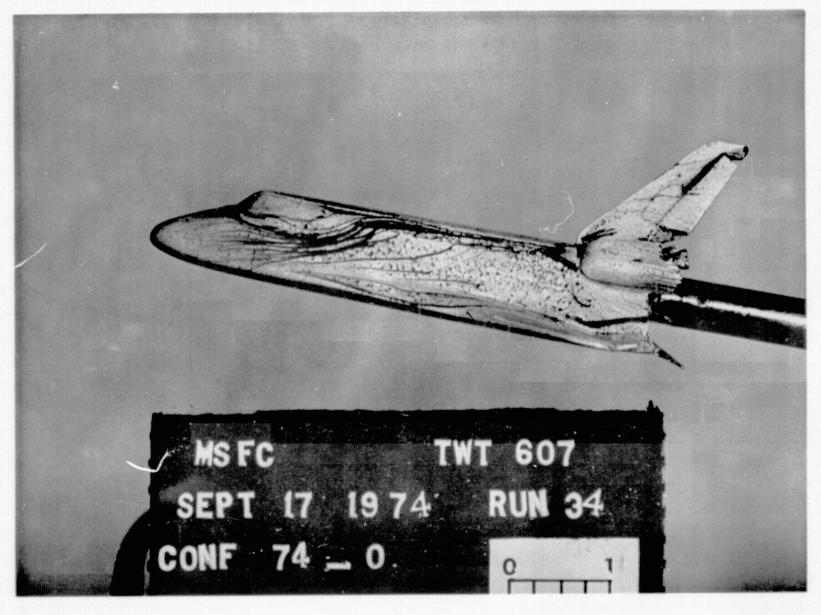


c. Top view

Figure 110. - Concluded.



a. Right side view



b. Left side view

Figure 111. - Continued.



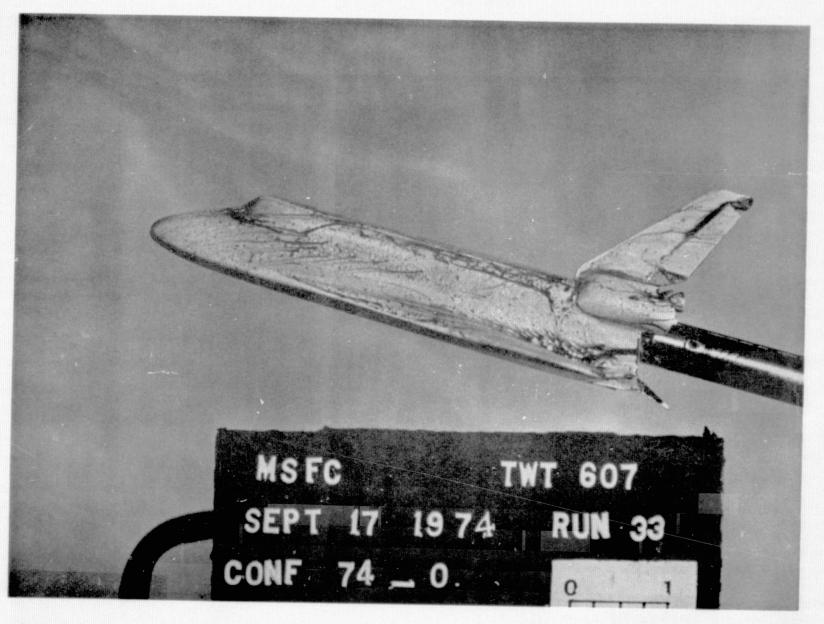
c. Top view

Figure 111. - Concluded.



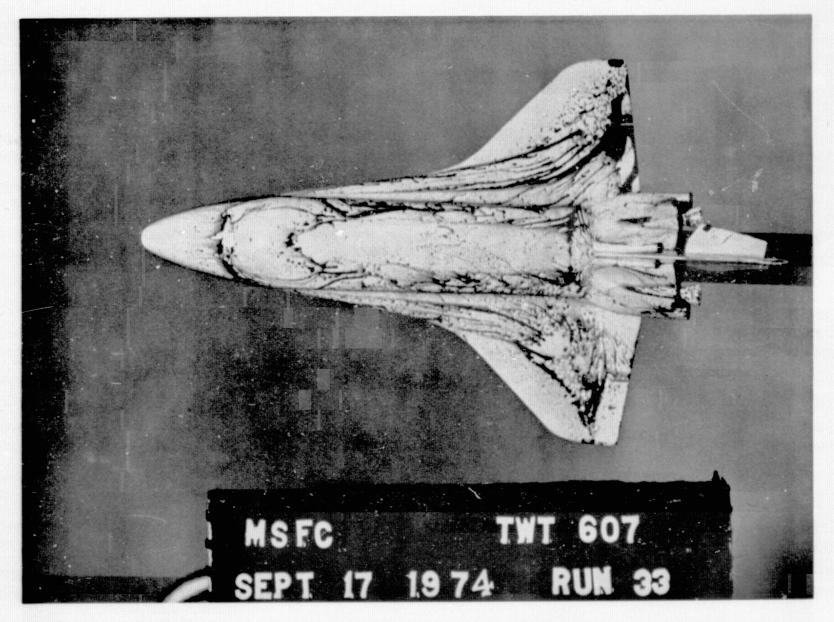
a. Right side view

Figure 112. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 15° MACH = 2.75



b. Left side view

Figure 112. - Continued.



c. Top view

Figure 112. - Concluded.



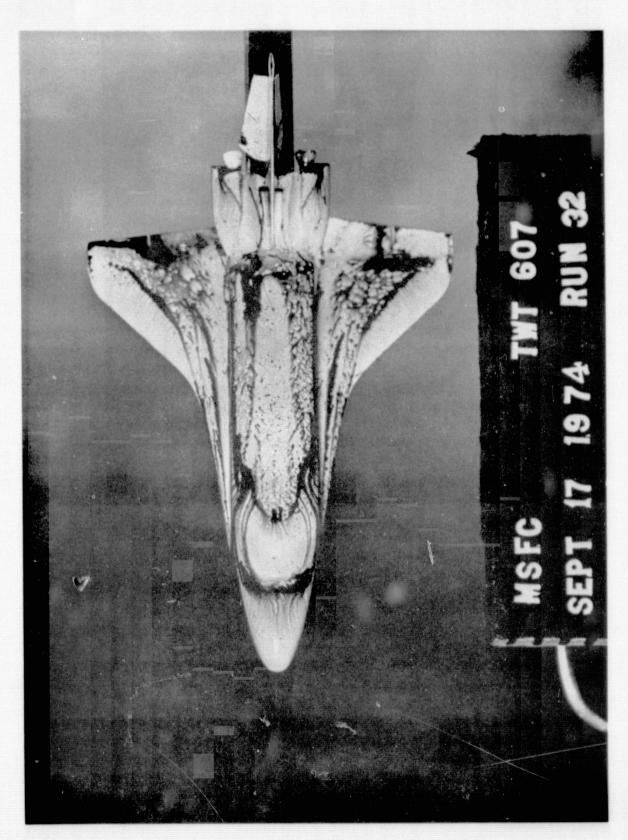
a. Right side view

Figure 113. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 20° MACH = 2.75



b. Left side view

Figure 113. - Continued.



0

c. Top view

Figure 113. - Concluded.



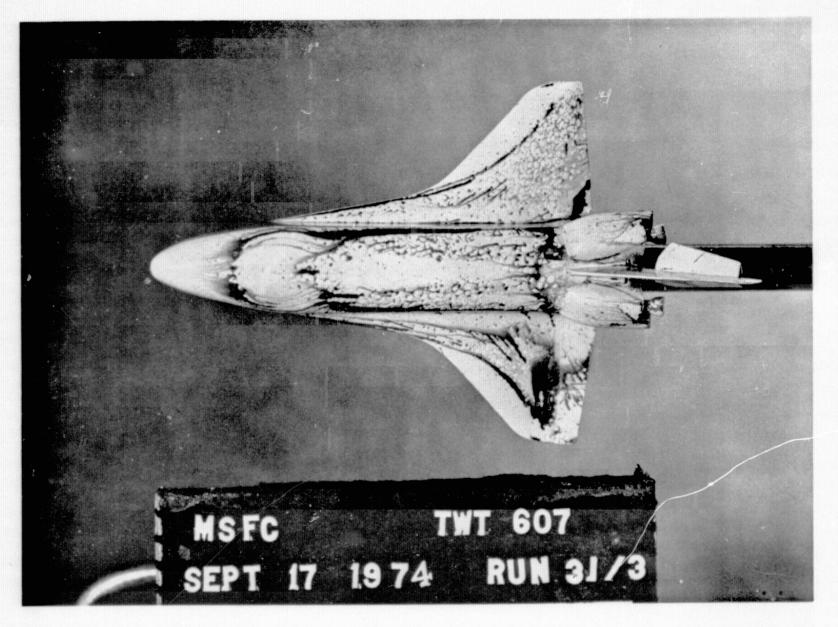
a. Right side view

Figure 114. - ELV-L = -18.8 ELV-R = 14.4 RUDDER = -25.0 SPDBRK = 87.2 BDFLAP = 23.7 ALPHA = 25° MACH = 2.75



b. Left side view

Figure 114. - Continued.



c. Top view

Figure 114. - Concluded.